MUSHROOMS FOR COLOR

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DOROTHY BEEBEE

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MUSHROOMS FOR COLOR

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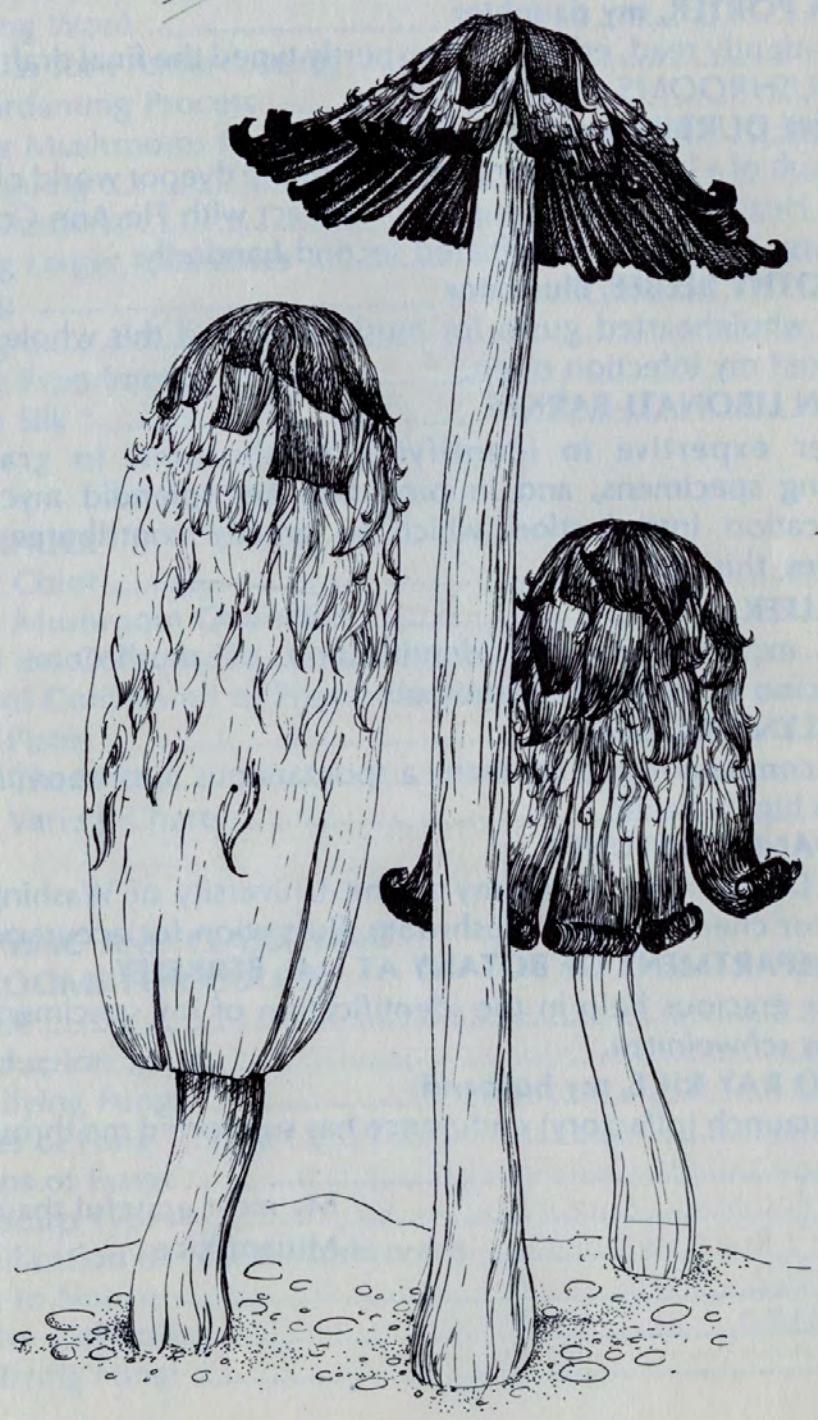
MUSHROOMS FOR COLOR

MIRIAM RICE DOROTHY BEEBEE



ACKNOWLEDGEMENTS

TO LISELOTTE GLOZER, my good friend
Who by frequent field trips taught me and shared with me her vast enthusiastic mycological knowledge (then gastronomically applied).

TO JAN DeVRIES, weaver and friend
Who saw in my frenetic alchemical efforts the potentiality expressed herein and quite literally took my hand to face the publishers and so cemented this committment now fullfilled.

TO MIRA PORTER, my daughter
Who patiently read, edited, and expertly typed the final draft of *LET'S TRY MUSHROOMS FOR COLOR*.

TO HELENE DURBIN, weaver and friend
As a result of a brief summer glimpse into the dyepot world of lichens on our Headlands and through her contact with Flo Ann Gordon of Roseburg, Oregon I was initiated second handedly.

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Whose wholehearted gusto for mushrooms and this whole project revitalized my infection often.

TO SUSAN LIBONATI-BARNES
For her expertise in identifying mushrooms, in graciously supplying specimens, and in providing her splendid mycological identification introduction which so greatly contributes to and enhances this book.

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Whose expertise in the identification of mushrooms of the Mendocino Coast I have leaned on.

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Whose companionship on many a spontaneous mushroom hunting trip I so highly value.

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Of the Department of Botany at the University of Washington in Seattle for checking each mushroom illustration for accuracy.

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For their gracious help in the identification of my specimen of the *Phaeolus schweinitzii*.

and last TO RAY RICE, my husband
Whose staunch (olfactory) endurance has supported me throughout.

My most grateful thanks,
Miriam Rice

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Agaricus

AN INVITATION Natural dye enthusiasts, weavers, mycologists—here is an open invitation to join the investigation, study, and experimentation in a new facet of mushrooms—**DYES**. Fungi and mushrooms give outstanding dye colors—yellows, golds, browns, oranges, greens, wines, purples, blacks, reds and yes **BLUES**—the whole spectrum.

PREFACE TO SECOND EDITION

Since the early mushroom dye results were so incredibly rewarding, numerous further tests of ever more species have followed over the past years. Thus the necessity for this new enlarged edition with its much expanded index, additional alphabetized list, charts, and the remarkably accurate drawings of fungi so beautifully here presented.

Mirabile dictu, the array of color ranges across the entire possible spectrum—yellows, browns, oranges abound; but so do reds, greens, purple and blues. Yes, even blue, that is so elusive from any dye stuff, adds to the extravagant richness of color this phyllum yields.

From one small mushroom—*Cortinarius phoeniceus* var. *occidentalis* there is a cascade of reds, red oranges, orange reds, apricots, and wines. Red, traditionally has been extracted from two separate sources: 1) an insect, cochineal and 2) a plant, madder root. Our one *Cortinarius* seems to yield the color range of them both. Which brings up the extraordinary light fastness of these dyes. A sample test of *Cortinarius phoeniceus* var. *occidentalis* left outside three months in sun, rain, storm, fog, and heavy morning dews one fall showed no fading, especially the red obtained with tin mordant. Then Mr. John Ash, dye chemist for the U.S. Department of Agriculture, Western Research Laboratories, in Richmond, California, tested for me in the Fade-Ometer a number of yarns dyed with a variety of mushrooms. To him I owe an unparalleled debt for his kindness and generosity—not only in taking my, so hesitantly offered, samples to test; but his two sentences of encouragement and praise have sent me pell mell down this happy mushroom-strewn path. With his permission, I quote

You are to be congratulated. These dyeings are *very* fast to light. Many commercial dyes are not as fast as these.

If that is not enough to keep the fungi simmering, the *Hydnacae* genus certainly have kept me further elated. Soft sylvan greens, dusty blues, smokey violets are here too, tantalizing the eye!

There are blacks—deep, rich blacks, greys and the ubiquitous tans, beiges. Who knows what further color wonders are yet to be extracted from the thousands of species still unknown. There are specific mushrooms I long to try; but, to date, I've not yet been able to obtain specimens. The list grows, but each year a few more fall my way—what about yours?

These tests have been done and redone numbers of times in an effort to verify results from year to year. They have been astonishingly consistent. I have tried mushrooms in all imaginable states I could think of: fresh, dried, powdered, deep frozen, freeze-dried, cooked and aged, aged uncooked, ammoniated, etc.—again with amazingly similar results. I would be delighted to hear of and to see results anyone else would care to share. The Index contains many species, but there are many more

tested and filed away that have not been included as being either not particularly noteworthy or just too redundant.

My color wheel of over one hundred and sixty four small mushroom dyed skeins exists as part of a traveling exhibit, "Mushrooms for Color," put together by the Mendocino County Museum of Willits, California, which is based on material in the first edition of *Let's Try Mushrooms for Color* and selections from the expanded Index. Numbers of beautiful weavings using the fungi dye accompany and are a delightful, integral part of the exhibit.

I take sole responsibility for any errors and oversights and hope that neither mycologists nor weaver-dyers will hold them against me. Both groups of dedicated people I hold in the highest esteem.

Dorothy Beebee is the superlative illustrator, whose many careful, exquisite drawings depict with accuracy the specific mushroom. Her great effort and cooperation have shared in the making of the Index what it is and we offer this working reference as clearly, as succinctly as we know how.

To Dr. Alexander H. Smith of the University of Michigan, my very special thanks for the specimens he so graciously supplied.

To Dr. David Largent of Humboldt State University, for the marvelously fresh *Hydnaceae* that were rushed from the field to me, my sincere appreciation. By his recognition and support of what has been done, I have been much encouraged. Now this second edition with his great mycological contribution has come into being and is thus enriched.

Thanks to Dr. Harry D. Theirs for his specimens directly supplied and indirectly through the Oakland and San Francisco Fungus Fairs. His generosity given so willingly to Dorothy Beebee by checking the accuracy of her drawings is gratefully acknowledged here by me too.

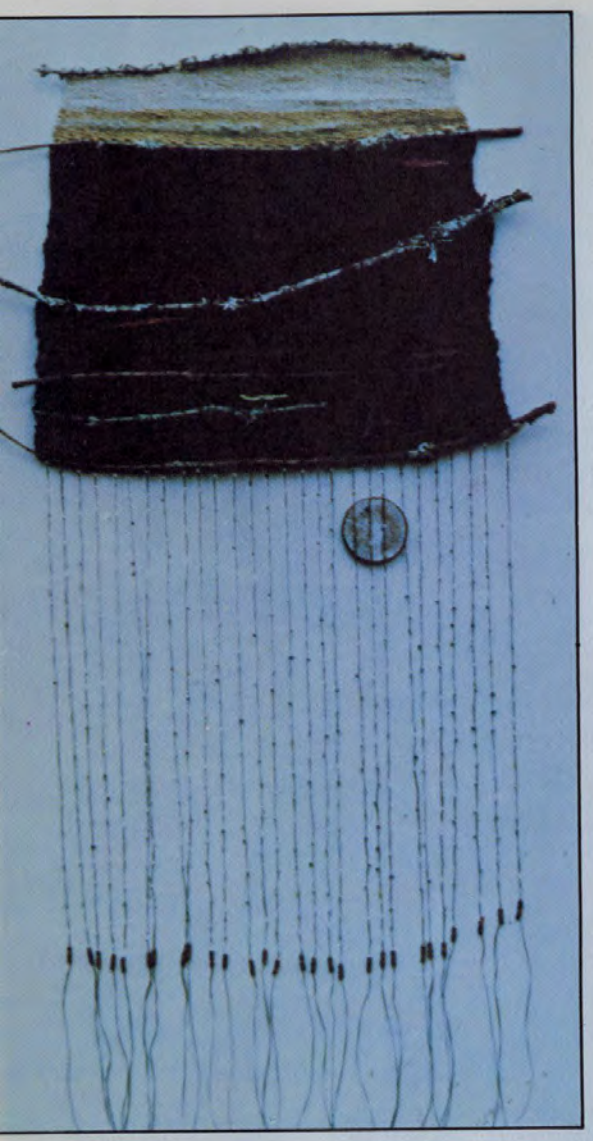
To Susan D. Libonati-Barnes again my thanks for all her information, interest and ready answers to questions hastily posed. Her contribution. to this edition is inestimable and is so recognized here.

Through a correspondence with Margaret Lewis from the earliest days, my enthusiasm has been gratefully nourished by her informed enthusiasm.

Many thanks to all those students and workshop members who are keeping the dye pots bubbling with . . . . mushrooms, of course.

Miriam C. Rice

Pouch by Elaine Lackey



Weavings by Sarah Long (left) and Janice Allen (right)

MUSHROOM DYES

Mycologists, naturalists, and friends of the wild edible mushroom have been lured back to the fire from the hunt in field and woods by the promise of pots filled with the delicious fruits of the day's effort. Now the adventure is open to the weaver, the spinner, and the natural dyer as well. With so vast and varied a supply of fungi—estimated in the thousands of known species—it is indeed a wonder their potential for dye has not been explored before!

It was through a young, though avid, interest in mushroom hunting, identification, and lore (originally with a gastronomic end in view) that during the lush season of 1971-1972 a fantastic yield made its way into my workshop-kitchen-home. In keeping with my teaching of simple textile techniques, it was perhaps inevitable that I should plop a sample test of premordanted yarn into a pot of boiled mushrooms and simmer it some more, just to see!

The *Hypholoma fasciculare* (commonly known as the "Sulphur Tuft") was the first mushroom I tested. Perhaps if my fledgling trial had not produced such spectacular yellows, greens, and tans, I would not have continued the heated hunt. Later, from a handful of these same little yellow green mushrooms found in clusters on dead wood, a beautiful burnt orange was obtained when a tin premordanted wool was added to my sample strands—what an unexpected delight!

Mushroom dyes are easy, and infinitely rewarding to extract. The wide range of color reveals unsuspected visual delight and a palette possibly unsurpassed by other natural dyestuff. The color fastness has been established and appears to be better than can be expected from most natural sources.

Not only do the mushrooms themselves and the colors they produce please me visually, but the Latin names of the mushrooms charm me aurally as they roll off the tongue. I look forward to the pleasures of the coming mushroom seasons and offer this book as a beginning of, and a basis for, future experimentation with mushrooms for color.

ABOUT DYES Dyes traditionally have been extracted from roots, leaves, stems, flowers, berries, lichen, bark, wood, clays, etc. The most prized red (crimson-red) has been from an insect (Cochineal) and from the madder root plant; and purple comes from the gland of a sea snail (Trumpet Shell) found near Tyre in the Mediterranean and from the Logwood tree in South America.

Natural dyes with their subtle and harmonious tones reigned supreme in the dyepots of the world until 1856 when coal tar dyes were invented. The first World War saw dye chemists perfecting the synthetic, then known as "Aniline," dyes whose vast color range and light-fastness seemed superior.

Now, with our ecological concerns awakened, interest in nature's dyes has reasserted itself with such vigor that weavers, spinners and dyers have literally embraced the botanical world wholeheartedly—and with love. The challenge of light-fastness has gained an ally of great promise in the fungi phyllum.

ABOUT MUSHROOMS A mushroom is the "fruit" of a fungus, like the fruit of an apple or orange tree. Nourishment for the fungus is received through the **mycelium**, which consists of white, threadlike strands, spread out and interlaced deep in the ground. It usually is not visible unless the earth under the mushroom is churned or dug up. The fruiting bodies contain the **spores**, the reproductive agents of the fungi; and upon germination they produce the new mycelium. The mycelium spreads continuously and produces new mushrooms. Picking in quantity does not deplete or destroy the source of supply as long as the mycelium, like a tree, is not radically distrubed. It is always a good practice to leave one fruiting body to insure spores which will produce a new mycelium for the next season.

It can be worthwhile to familiarize yourself with the anatomy of mushrooms and the scientific classification (Latin names) of the fungi for two reasons. For dyeing purposes, close identification is desirable if you wish to duplicate your results, or communicate them to someone else. The more important reason is to be able to recognize poisonous species with certainly.

Uppermost in many minds is the question of handling poisonous mushrooms—caution is always advisable. However, mushrooms must be ingested—eaten in some quantity in order to be harmful to us. I have deliberately refrained from trying the two deadly *Amanitas*: *Amanita phalloides* (death cup) and *Amanita virosea* (destroying angel).

Amanitas

However, I did test the *Amanita muscaria*, that handsome red mushroom with white scab-like spots, and had disappointingly drab dye results. Get to know the few poisonous species by consulting the literature, which is almost as plentiful as the fungi, by joining the nearest mycological society and haunting it regularly. Of course, it is helpful to find a knowledgeable companion who is willing to share or accumulate information with you.

GATHERING MUSHROOMS FOR DYE

WHERE? Directly under foot.

Mushrooms grow in woods and fields. Each thrives in its own particular environment. Some are found widely, others only in very special places. Look anywhere: in a pasture, or a fallen tree trunk, under a pine tree, even by the roadwise. The Shaggy Mane, for example, prefers the gravelly edge of a well-traveled road.

WHEN? Year round.

Like flowers, mushrooms are seasonal. As a general guideline, look for their appearance a day or so after a heavy rainfall. With practice in identification you will know which mushrooms in your area to expect each season.

HOW? Simply pluck the mushrooms carefully.

If you wish to identify an unknown mushroom, be sure to take the base of the stipe. It can be important to know the shape and size of the entire stipe as well as whether a volva is present. If you are sure of your identification, cut off the stipe near the ground with a sharp knife to reduce the amount of decaying debris and soil brought home. Place the mushroom in a flat basket or tray. Bags, waxpaper or brown, are handy to separate the species.

HOW MANY? A good question!

Most of my tests consisted of very small quantities of any one species, a few mushrooms in a pint of water, since my goal was not quantity dyeing, but to find out the color range possible. By weight, equal parts plant dyestuff to equal quantity of wool—the usual rule for natural dyeing may apply as a starter. **Traditionally, 1 ounce of wool to 1 quart of fresh blossoms or leaves or 1 ounce of wool to 1 pint of dried leaves or blossoms was used.** Experience now has shown, in the mushroom realm, the concentration of dye substances in each species is far more the determining factor so that no rule of thumb can be looked to for best, better, or any special results. A few *Cortinarius phoeniceus* var. *occidentalis* gives a potent dye but the *Hydnum imbricatum*, a considerably larger fungus, produces a relatively weak dye bath so that a far, far larger quantity is necessary to obtain the desired hue. So we do now know that size alone is also not a criterion for dye potency and each specie seems to be a rule unto itself.

PREPARATION? Wash and mash.

Dirt and debris can be removed gently with a knife or under the faucet. Then cut up or mash the mushrooms. Usually the whole mushroom is used for dyeing, but sometimes you may wish to try only a part. The tubes of the *Boletus edulis* alone produce a yellow-green to brown depending on the mordant. Tin mordant produces orange.

ABOUT WATER Distilled water is preferable. Since chlorine in water affects color adversely (bleaches), city water may very well show different results, and therefore would not conform to the colors herein recorded. However, if your results from your source of water please you, just consistently conduct your work using the same source. Water from individual wells has its own chemical balance and so must be judged independently too. Iron, copper, alkali, etc. in the water supply affects the colors consistently: darkening, greening, etc. These varying results are, not doubt, precursors to modern mordanting methods.

ABOUT MORDANTS The word "mordant" is from the Latin **modere**—to bite. Mordanting is a chemical process. Mordants are metallic salts. Mordants fix the dye to the wool as well as govern the color obtained from the dyestuff.

Probably it was observed that copper, tin, or iron pots used for dyeing affected the color obtained. Also the minerals in the water supply varied and seemed also to produce different results; and so today we basically use the following five mineral salts commonly known as mordants:

ALUM-potassium aluminum sulfate
CHROME-potassium dichromate
TIN-stannous chloride
COPPER-copper sulfate (blue vitriol, bluestone)
IRON-ferrous sulfate (copperas)

There are two common additives:

CREAM OF TARTAR-(tartaric acid or potassium bitartrate) a residue of wine-making is added to most mordants to brighten a color.
GLAUBER'S SALT-(sodium sulfate) is sometimes added to help prevent streaking and even out a color.

For experimenting with children or just plain fun, try dyeing in an aluminum pot, tin can, or copper pot. Pennies can be added to the dye pot for copper. Iron nails do in place of an iron pot. The results of course will be chancey but interesting.

ABOUT WOOL Wool is a living fiber which has been woven by hand, by spindle, and by loom since time immemorial. Called "The Golden Fleece," it has always meant warmth and comfort, insulating from rain and cold, yet light and durable.

Each wool fiber is made of millions of coiled springs (protein molecules) that stretch in use—but coil back to their original position.

Because of this, they can be twisted without breaking.

The unmatched dyeing quality of wool (its absorbency) is due to the moisture-borne dye actually reacting and combining with the protein of the cell structure thus becoming an integral part of the fiber.

Commonly, wool is considered the fleece off a sheep's back; and it is from sheep most wool is available. We must not forget, however, our South American wool-bearing lamoid family of llamas, alpaca, guanaco, and vicunas (Auchenia fibers); and last, perhaps the softest of all wools, the Angora rabbit and the Cashmere goat.

Each fleece accepts the dye differently, producing slightly varying color. This can be used effectively most of the time, in fact this is one of the joys of natural dyeing—the "richness" that results.

SCOURING WOOL To remove grease (lanolin) or any other foreign substance (dirt, dead leaves, twigs, even blood) that might be lurking in the fleece, scour the wool to prepare it for dyeing. To do so add 2 to 3 tablespoons of mild soap flakes to 2 quarts of water, then add 4 ounces of wool. Simmer for 1/2 hour - (180°-195°F or 85°-90°C) - for commercial wool to remove sizing and possible bleaches; for 1 hour - for handspun. Rinse in warm water several times, squeezing gently (do not twist), then in cold water to be sure the wool is soft, clean—yes, beautiful!

FORMULAS FOR PREMORDANTING When no mordant is desirable or necessary to bring out lasting color, the dye is called a **substantive** dye. **Adjective** dye is dye using a mordant. Mordanting the wool *before* placing it in a dye bath is called premordanting. Traditionally mordanting *after* dyeing with

IRON-tends to darken colors and is called "saddening."
TIN-the last 10 minutes of dyeing by adding "a pinch of tin" the color is brightened and is called "blooming."

The following are general formulas for premordanting 4 ounces of wool. Minor adjustments as a result of your experience will provide you with your own working recipes. Larger or smaller quantities of wool can be premordanted in one pot as long as the formula is adjusted.

ALUM
1 Tablespoon + 2 teaspoon alum
2 teaspoon cream of tartar

TIN
½ teaspoon stannous chloride
4 teaspoon cream of tartar

CHROME
1/2 teaspoon potassium dichromate
1 teaspoon cream of tartar

COPPER
1 Tablespoon copper sulfate

IRON
4½ teaspoon ferrous sulfate
1 teaspoon cream of tartar
2 Tablespoon Glauber's salt

2 to 3 quarts of water is sufficient to cover 4 ounces of wool. When mordanting with both chrome and tin, be sure to cover the pots and work in a well ventilated room—outdoors preferable. The fumes of these mordants are said to be injurious to health.

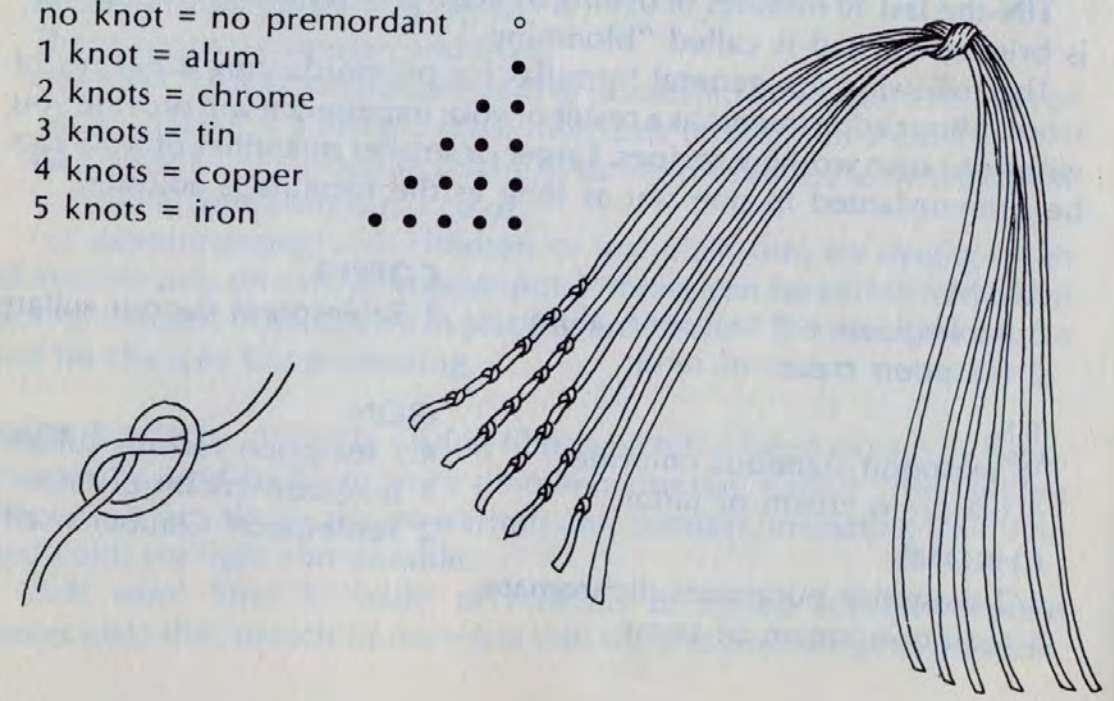
For safety, use a special enamel or stainless steel pot, reserved only for dyeing, and remember to **KEEP ALL DYE MATERIALS OUT OF THE REACH OF CHILDREN.**

PREMORDANTING PROCESS CAUTION: Some of these chemicals are poisonous. Do not handle carelessly. Use for dyeing purposes only. Use white or natural wool. Use a stainless steel or enamel pot. Dissolve chemicals (mordant, cream of tartar, and Glauber's salt) in 1 to 2 cups of hot water in a pyrex pitcher first, then pour the dissolved chemicals into the pot with hot water sufficient to cover wool to be dyed. Add wet wool to the solution. Simmer for 1 hour (180° - 195° F or 85° - 90°C). Do not stir the wool, but lift and shift it gently with a wood or stainless steel utensil to make sure all parts receive the liquid evenly.

Allow wool to cool in the bath. Remove the wool from the pot and squeeze it gently. Rinse in cold water. If haste is important remove the wool and rinse in warm water first, then cold. Dry or dye. Keep pots covered while simmering. Premordant and dye in a well ventilated room or outdoors if possible.

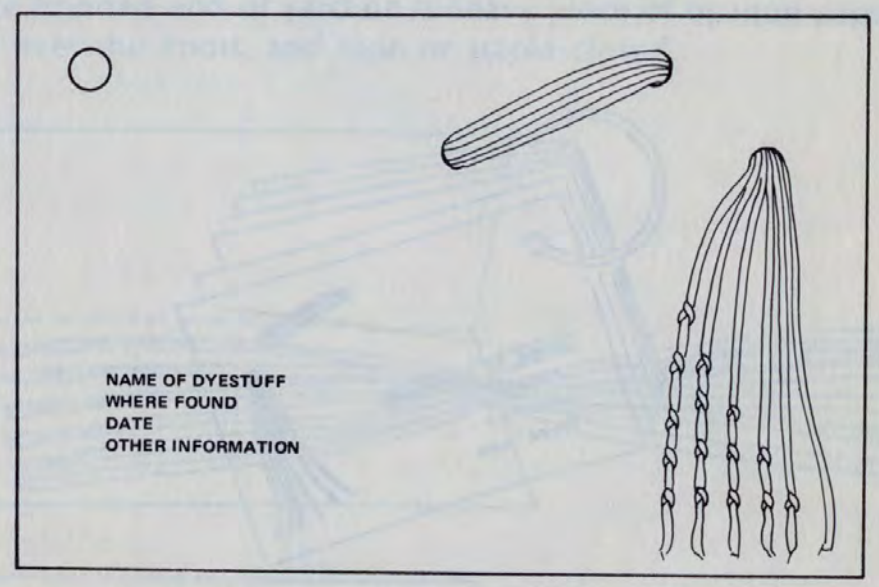
TESTING MUSHROOMS FOR COLOR By adopting a language of knots representing the five most commonly used mordants, we can record and share our results at a touch and a glance. Cut off 12 inches of each kind of premordanted wool and knot at one end with the appropriate number of knots.

no knot = no premordant
1 knot = alum
2 knots = chrome
3 knots = tin
4 knots = copper
5 knots = iron



Tie the five premordanted and the one natural strand (six strands) together in the middle. You now have a test swatch. Kept in ready supply, a swatch can be plopped into a simmering mushroom dye pot at a moment's notice. For an experimental dye bath, simmer a small batch of mashed mushrooms in a pint or so of water for 1/2 to 1 hour. To wet the test swatch to the necessary temperature, hold it under the faucet, starting with warm water and letting it get hot. Add the wet test swatch to the mushroom liquor. Mushrooms do not have to be strained from the dye bath for test yarns. Simmer the yarns for 1/2 to 1 hour, adding water if needed. The swatch can be rinsed directly from the hot dye with hot water. Then, wash in warm water with soap, rinse, and dry.

CATALOGUING By attaching a finished swatch to a card labeled with the name of the mushroom , you will know what mushroom gives what color with what mordant. Information instantly!

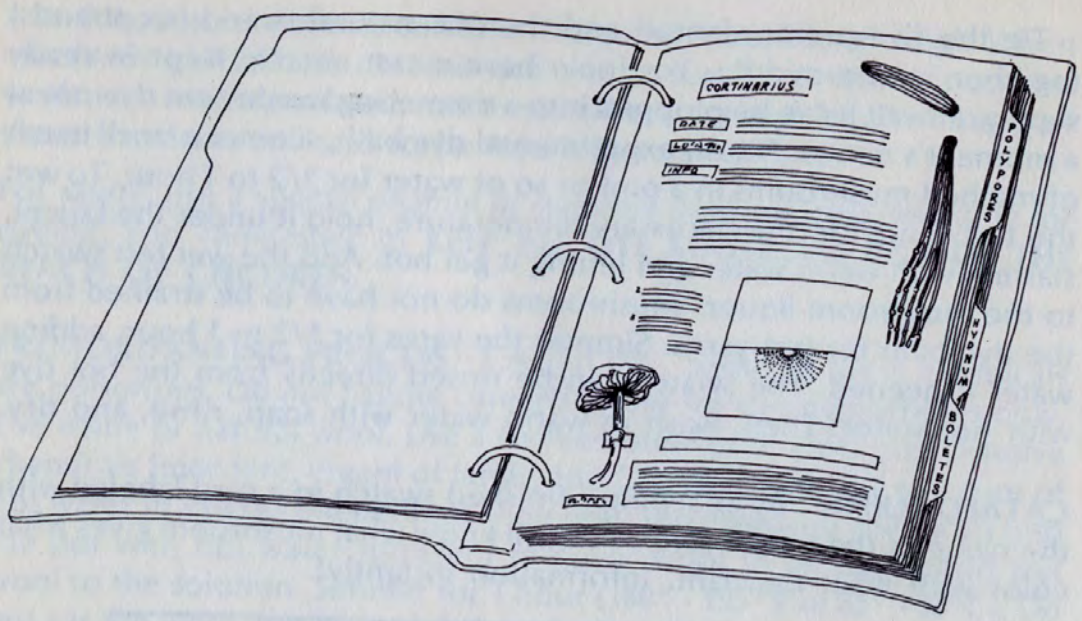


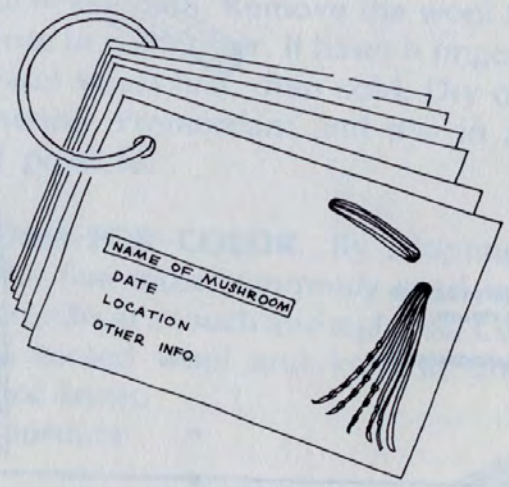
Then, of course, do record WHERE - your fungus specimen was found, the DATE - day, month, year, and OTHER INFORMATION - just about any other pertinent fact you can think of: Here are a few examples

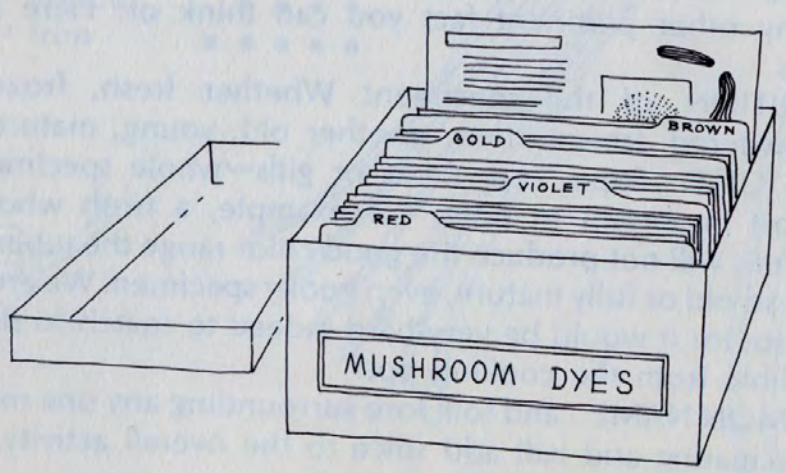
CONDITION of the specimen: Whether fresh, frozen, dried, powdered, freeze-dried, whether old, young, mature.

PARTS USED Stipe, cap, tubes or gills—whole specimen. This is most important to note. For example, a fresh whole *Boletus edulis* will not produce the good color range the tubes alone will of an old or fully mature, even gooky specimen. We are lucky this is so, for it would be very hard indeed to snatch so desirable an edible from the cooking pot!

COMMON NAME and folk lore surrounding any one mushroom is fascinating and will add spice to the overall activity.







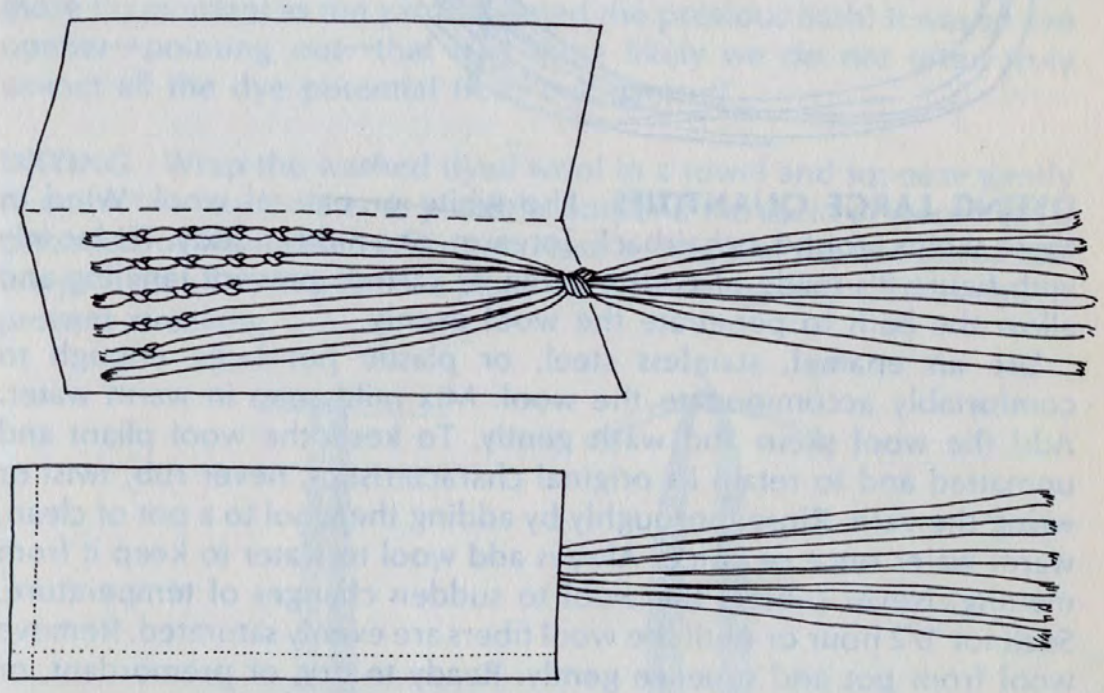
DATE DYED and any surrounding features of memorable interest. NUMBER of specimens used or WEIGHT of specimen used and WEIGHT of wool used—kind of wool—commercial or handspun. All of this can aid in repeating results and sharing or comparing with other dyers.

These cards can easily be kept on a ring or stored in a small box, filed according to dye color, or mushroom species.

Dye samples can also be mounted on heavy paper with a spore print, sketch, or even a dried mushroom sample for identification information.

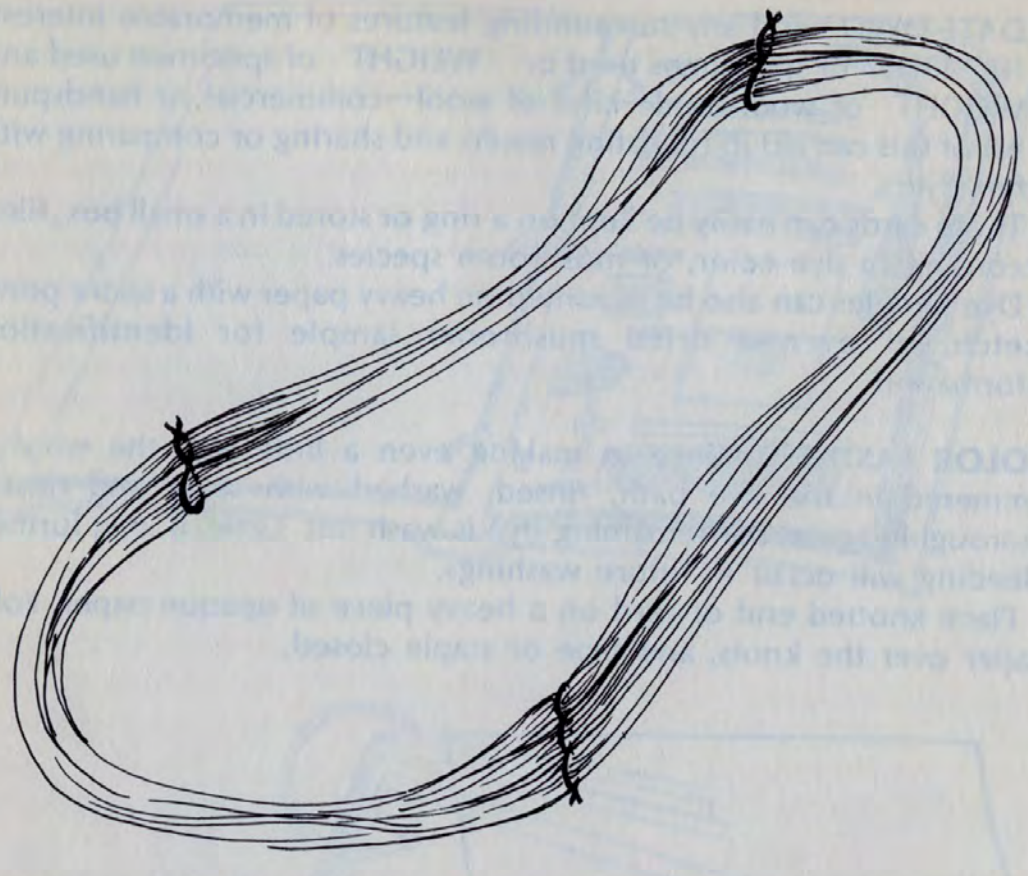
COLOR FASTNESS Since in making even a little test, the wool is simmered in the dye bath, rinsed, washed with soap, and rinsed thoroughly again, the remaining dye is wash fast. Little, if any, further bleeding will occur in future washings.

Place knotted end of yard on a heavy piece of opaque paper. Fold paper over the knots, and tape or staple closed.



Expose the uncovered yarns to the direct sun for two weeks, then open the folder and compare the sun-tested yarns with those that were covered. The yarn swatch, thus tested can then be mounted on a card with the sun-test labeled.

Exposing a part of the dyed yarn to direct sunlight for several weeks and comparing the result with the original indicates whether a color is **fugitive** or **sun fast**. So far, the ones I have tried have retained their colors rewardingly well.



DYEING LARGE QUANTITIES Use white or natural wool. Wind in loose skeins around a chairback, forearm, or a niddy noddy. Tie loosely with figure 8's made of cotton string or yarn to prevent tangling and allow the bath to penetrate the wool evenly.

Use an enamel, stainless steel, or plastic pot large enough to comfortably accommodate the wool. Mix mild soap in warm water. Add the wool skein and wash gently. To keep the wool pliant and unmatted and to retain its original characteristics, never rub, twist or wring the yarn. Rinse thoroughly by adding the wool to a pot of clean, warm water once or twice. Always add wool to water to keep it from matting. Never subject the wool to sudden changes of temperature. Soak for 1/2 hour or until the wool fibers are evenly saturated. Remove wool from pot and squeeze gently. Ready to dry, or premordant, or dye.

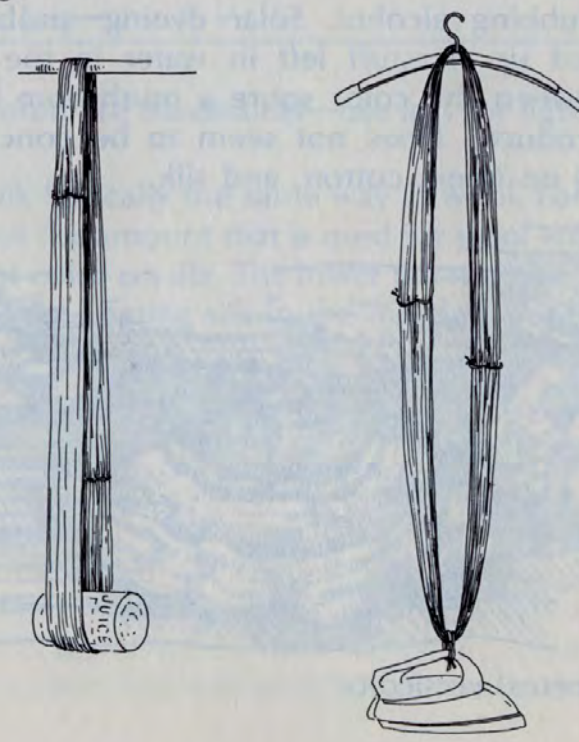
DYEING Use an enamel or stainless steel pot which you keep for dyeing use only. Cover the washed and mashed mushrooms with water. Bring to a boil (212°F or 100°C). Simmer for 1/2 to 1 hour (180° - 195° or 85° - 90°C). Add more water if needed. Water does not dilute dye, but absorption of the dye by the wool does leave a bath diluted and does produce a lighter or quite different color. Drain boiled mushrooms through a cloth bag (optional). Save the dye bath.

Enter wool in dye bath. Reheat and simmer for 1/2 to 1 hour to dye. Allow the wool to cool in the bath. Remove the dyed wool from the pot and squeeze gently. Rinse in warm water. Wash gently in warm water and soap. Rinse thoroughly.

The initial simmering of water and mushrooms is called the **dye bath**. After the dyed wool is removed, the remaining used dyebath, with more water added if necessary, is called the **after bath** when used to continue dyeing more wool. Repeating the procedure produces the **second after bath, third**—etc. When all dye is absorbed by the wool, the dye bath is called "exhausted." It is not necessarily exhausted each time you use it. Saving and aging the liquor can produce exciting results.

We shall see that consistent with traditional natural dyeing, iron and tin do indeed "sadden" and "bloom" the color range obtained in each sample. In one workshop where the dried tubes of *Boletus edulis* were used in a tin can, one student was so carried away she continued into the wee hours of the morning adding small quantities of tin and water and obtaining from brilliant orange to golds and yellows—an incredible quantity of dyed yarn from the same tubes—just by adding more and more tin mordant as the yarn depleted the previous bath! It was an eye opener—pointing out—that is is quite likely we do not often truly extract all the dye potential from our dyestuff.

DRYING Wrap the washed dyed wool in a towel and squeeze gently to extract as much water as possible. Suspend the skein of wool from a rod, stick, or wooden coat hanger. Place a weight at the bottom to pull the yarn taut. Dry in a darkish place out of direct sunlight. This helps to prevent streaking.

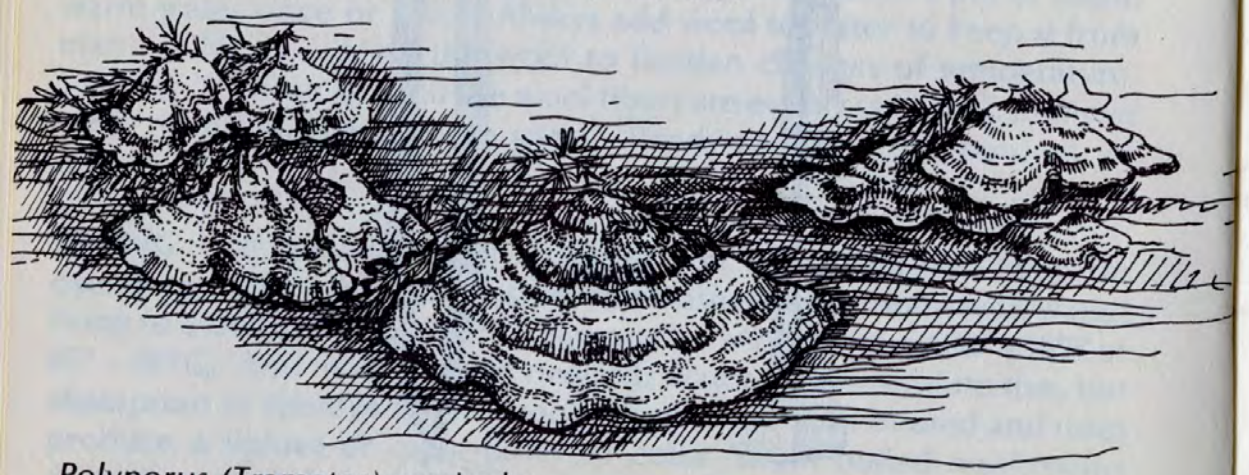


FUTURE EXPERIMENTS There are possibilities that can be studied as an added aid in the identification of species when all else fails. For example, the comparison of color obtained with tin mordant say in the *Cortinarius californicus* group along might well establish marked differences so that the separation of species may be realized. Such a chart would be exciting to develop.

Further fruitful research into the area of "growing mushrooms" for dye purposes, as a dependable source supply, offers much room for experimentation, too. Surely others can and will come up with many ideas to try in the future. The frenetic and exhilarating efforts of the past years did not allow time to explore all the possibilities I can think of. Here are a few:

Compare fresh mushrooms with that of fresh frozen and chart results. Compare dye from dried mushrooms with that of fresh and chart results. Does the same species of mushroom yield different results depending on the area in which it grows? - in the U.S. - all over the world? What color would a combination of mushrooms produce? Chart results. What colors results from dyeing one color over another? Record. Would the results differ if an uncooked mushroom were aged by soaking for 2 or 3 months? Seems to lose color - more evidence needed. What happens when the cooked mushrooms age for 2 or 3 months? I have tried some, but more results are needed. Seems to have fine dyeing potential - more potential. What would happen if common salt were used as a fixing agent and to alter the color? How would vinegar (acetic acid) work as a mordant? What are the results of adding ammonia or urine to raw, chopped mushrooms and letting them steep for a month?

Try adding rubbing alcohol. Solar dyeing—probably how it all started—chopped up dyestuff left in water in the sun. Is there a relationship between the color spore a mushroom has and the dye color it will produce? Does not seem to be conclusively so. Test mushroom dyes on linen, cotton, and silk.



Polyporus (Trametes) versicolor

ABOUT SILK Silk will take natural dyes, and there is work to be done still on recording the color with mushrooms. A few have been tried with success. Cheryl Kolender's work on dyeing silk with natural dyestuff is noteworthy—see her article in *Spindle, Shuttle & Dyestuff* spring of 1978. Here is a possible treasure-trove of glorious color. With her permission, this chart follows:

TABLE OF MORDANTS FOR SILK

Mordant	Amount per pound silk	Use with:	Heat
Tin	½ ounce or less	Cream of Tartar 2 ounces or less	Cold or warm
Alum	4 ounces or less	Cream of Tartar 1 ounce or less	Cold, warm or hot
Chrome	1 ounce or less	—	Hot— ½ hour
Iron	½ ounce or less	—	Cold
Copper	½ ounce or less	—	Cold

Amounts noted are maximums—use less for lighter colors

Mordant the silk basically the same way as wool. For most dyestuffs, two or three times the amount that is used for wool will be needed for the same depth of color on silk. The lower the temperature, the gentler it is on the silk. After heating silk in the mordant, let it cool in the pot overnight.

COLOR INDEX

ABOUT COLOR To reduce the colors obtained so far to the categories we have in the color chart is a difficult undertaking. The vast array of shades extant makes it barely possible to squeeze one sample into an already established slot. That there will be differences of opinion there is no doubt. No two people will see color exactly alike and therefore agree on all counts on a descriptive name. Much work has been done over the years to so regularize and codify color. However, given the visual acumen I may or may not possess these categories presented will stand—do remember that it is the uncertainties and variables that actually enhance the quest and aesthetic satisfaction.

So an approximation is fine and should your results for the most part, coincide, we may all thank the mushrooms whose consistency on the whole I find remarkable. Should the color please you—happy day!

ABOUT MUSHROOM QUANTITIES The quantity of mushrooms needed for testing is a variable that depends on the mushroom used itself. Therefore, there is no rule of thumb or general amount to any given quantity of water. But do not let this deter you from trying whatever amount of any one species you have in hand—simply cover that amount with water—try—and record. It becomes evident that the strength of the dyebath resulting will determine the quantity of wool dyed and that quantity manifests itself by the continuous addition of water and more wool—and see. The chemicals that procedure the dye seem to reside in each spore to a varying degree, thus the *Cortinarius cinnamoneus* though a small mushroom has very powerful dye content and a *Hydnum imbricatum* for its large size seems to have a much weaker content of the blue-producing chemical with tin mordant. In other words, the dye chemistry now known or still to be known can be and will eventually give us clues to quantity and concentration more specifically at a later date.

ABOUT THE COLOR INDEX The color is listed, first and then the mushrooms likely to produce it with the mordant needed. To use this index by the color desired first: refer to the color plates and the page will be indicated with the list of presently recorded mushrooms which will or should produce it. Then with your mushroom in hand, the mordant and ever ready dye pot, just add the water and go to it. To test the possibilities of a freshly found specimen, the test yard sample will reveal the six colors and then color by color you can as above check out your results. There are a myriad of tans, beiges, off whites, pale grey to delight the painter's, designer's, weaver's eye, but only a

fraction are here recorded. As your samples accrue, please do start your own charts and in time, we might all pool information and so expand further our current knowledge.

The nomenclature used only hints at the subtle variety within each category.

DEFINITIONS OF TERMS IN COLOR INDEX
UNDER CONDITION OF MUSHROOM

AGED - Dyebath remaining after dyeing and retained bottled for any given period of time.
DRIED - Fresh mushroom's moisture evaporated by low-slow heat.
FRESH - Recently plucked from habitat.
FRESH-FROZEN - Freshly picked then frozen in freezer as is.
OLD - Mushroom past its prime on verge of deteriorating - or already doing so.
POWDER - Pulverized dried mushroom.
YOUNG - a) 1st year growth i.e. *Phaeolus schwienitzii* with yellow rim. b) not quite mature.
MATURE - Mushroom at height of its spore production.

Although a few of the mushrooms which give virtually no or little color are included in this **INDEX**, perhaps a very short list of those that have been tried and *found wanting* might prove helpful after all.

Amanita muscaria
Cantharellus cibarius
Cantharellus infundibuliformis
Clavaria aurea
Coprinus comatus
Cortinarius gentilis
Cortinarius saturninus
Helvella lacunosa
Helvella californicus
Hydnum repandum
Lactarius deliciosus
Lactarius piperatus
Lactarius rufus
Laccaria amethystina
Leotia lubrica
Lepista nuda
Morchella angusticeps
Pluteus cervinus
Aleuria aurantia (orange peel fungus)
Pseudohydnum gelatinosum
Russula (a number of them)

This does not mean other attempts with some changed factor might not have different results. Once again and finally I must reiterate that many, many others could swell this list if I but knew their names or kept a record of every one every tried.

Fortunately for us too — some very edible and choice mushrooms are not at all choice for color; for example, "the morel," "chantrelle," "hedgehog," "shaggy mane," "field mushroom," "wood blewits," so commonly called, attesting to their popularity.

CONVERSION OF PREMORDANTING FORMULAS

(N.M. not measurable in ounces)

wool	mordant	spoonfuls	ounces	grams
4 oz. wool	Alum	1T + 2 tsp.	1 oz.	28 gr.
	cream of tartar	2 tsp.	1/3 oz.	10 gr.
1 lb. wool	Alum	6 T + 2 tsp.	4 oz.	112 gr.
	cream of tartar	2 T + 2 tsp.	1 1/3 oz.	40 gr.
4 oz. wool	Chrome	1/2 tsp.	N.M. in oz.	4 gr.
	cream tartar	1 tsp.	N.M. in oz.	5 gr.
1 lb. wool	Chrome	2 tsp.	1/2 oz.	16 gr.
	cream of tartar	4 tsp.	3/4 oz.	20 gr.
4 oz. wool	Tin	1/2 tsp.	N.M. in oz.	4 gr.
	cream of tartar	4 tsp.	3/4 oz.	20 gr.
1 lb. wool	Tin	2 tsp.	3 oz.	16 gr.
	cream of tartar	2 T + 2 tsp.	3 oz.	80 gr.
4 oz. wool	Copper	1 T	1/2 oz.	12 gr.
1 lb. wool	Copper	4 T	2 oz.	48 gr.
4 oz. wool	Iron	4 1/2 tsp.	3/4 oz.	20 gr.
	cream of tartar	1 tsp.	N.M. in oz.	5 gr.
	Glauber salt	2 T	1 3/4 oz.	42 gr.
	Iron	6 T	3 oz.	80 gr.
wool	cream of tartar	4 tsp.	3/4 oz.	20 gr.
	Glauber salt	8 T	6 oz.	168 gr.

Cypress by Linda Jones

RED

ORANGE

WINE RED

BURNT ORANGE

BLOOD RED

RED ORANGE

ORANGE RED

YELLOW ORANGE

PINK

APRICOT

SALMON PINK

YELLOW

GREEN

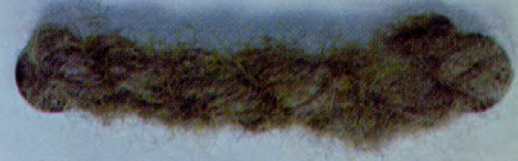
GOLD

YELLOW GREEN

LEMON YELLOW

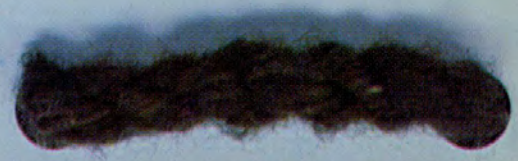
FOREST GREEN

GREENISH YELLOW

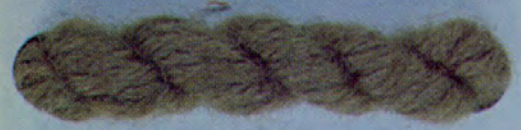


GRAY GREEN

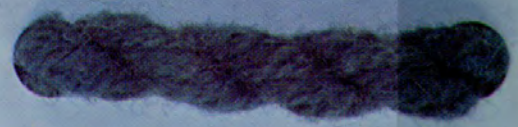
MUSTARD



BLUE GREEN

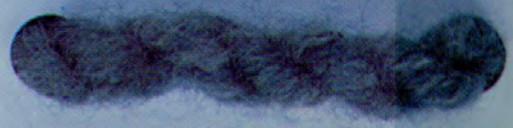


SAGE GREEN



BLUE

BROWN GREEN



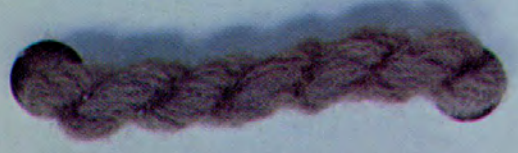
LIGHT BLUE

OLIVE GREEN

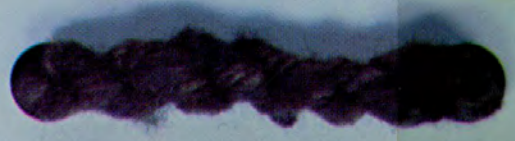
GREENISH BLUE

GREEN GRAY

BLUE GRAY



WARM GRAY

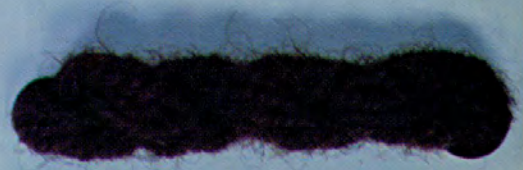


NAVY BLUE

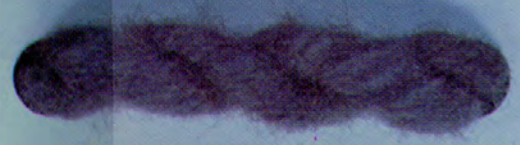
PURPLE

BROWN

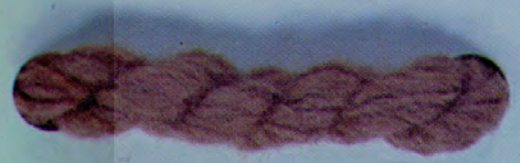
BLUE PURPLE



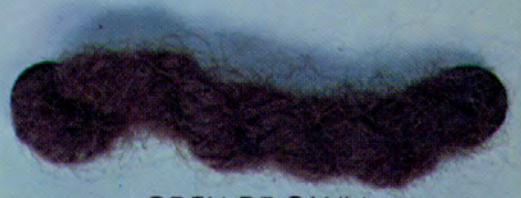
DARK BROWN



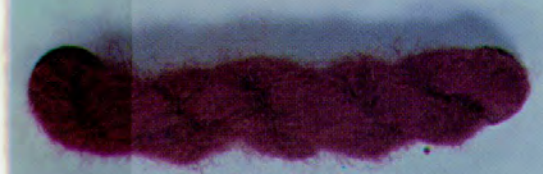
LAVENDER



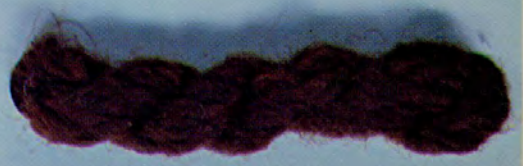
MAUVE



GREY BROWN



BURGUNDY



RED BROWN

ROSE

DUSTY ROSE

CINNAMON

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
RED	*Cortinarius croceofolius*	whole	dried, powdery	tin	sp. from Seattle
	Cortinarius phoeniceus var.*occidentalis*	whole	fresh, or dried	tin	late Fall, 1st bath--1 oz. mushrooms to 2 oz. wool produces 5 good after-baths!
WINE RED	*Cortinarius croceofolius*	whole	dried	alum	sp. from Seattle, from S.D.L.-Barnes
	Cortinarius phoeniceus var. *occidentalis*	whole	fresh	alum	
BLOOD RED	*Cortinarius phoeniceus* var. *occidentalis*	whole	fresh, or dried	tin	both 1st and 2nd afterbaths
ORANGE-RED	*Cortinarius croceofolius*	whole	dried, powdery	tin	1st afterbath
	Cortinarius sp. (long stemmed)	whole	fresh	tin	color almost irridescent from only 2½ specimens!
	Cortinarius phoeniceus var.*occidentalis*	whole	fresh, or dried	tin	1st afterbath, (found early Fall through late Winter)
	Cortinarius sanguineus	whole	dried	tin	S.D.L.-Barnes sp. from Oregon
		whole	fresh	alum	wool sample sent from Sweden-C. Sundstrom

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
PINK	*Chroogomphus (Gomphidius) vinicolor*	whole	fresh-frozen	none tin	late Winter; a pale dusty pink
	Collybia acervata	whole	dried	none	
	Cortinarius sp. *(californicus group)*	whole	dried	none, alum	late Winter - Mendocino sp. Largent's sp.
SALMON PINK	*Cortinarius aureifolius*	whole	semi-dried	none, alum	Winter
	Cortinarius californicus	whole	dried in 1937	alum	sp. collected by A.H. Smith in 1937 from Blue Lake, Oregon Dye done in 1977!
	Cortinarius sanguineus	whole	dried	tin	3rd afterbath
	Cortinarius semisanguineus	whole	dried	tin	Smith's sp. 58023 - Michigan
	Cortinarius sp.	whole	fresh	tin	bright color from 1st afterbath
	Hypomyces lactifluorum	whole	dried	chrome	
	Leccinum scabrum	tubes	fresh	alum	early Fall
APRICOT ORANGE	*Boletus aurantiacus* (=*Leccinum*)	tubes	fresh	alum	Fall, same as *Leccinum versipellis*
	Cortinarius californicus	whole	dried	none,	sp. from Oregon by
	Cortinarius croceofolius	whole	dried	none, alum	A.H. Smith's
	Cortinarius phoeniceus var. *occidentalis*	whole	fresh, or dried	none	1st and 2nd afterbaths; also with alum and tin in 4th afterbath.

	Cortinarius sanguineus	whole	dried	none, alum,	2nd afterbath
	Cortinarius semisanguineus	whole	dried	none, alum,	Smith's sp. - 58023 - Michigan
	Echinodontium tinctorium	whole	dried	none, tin	also known as "Indian Paint Fungus" or "conk". sp. from Dr. H.D. Thiers.
	Gyromitra infula	whole	fresh	alum	Winter
	Hypomyces lactifluorum	whole	dried	none, alum, tin, iron, copper	
ORANGE	*Boletus aereus*	tubes	fresh	tin	Fall
	Boletus edulis	tubes	fresh	tin	early Fall
	Boletus granulatus (=Suillus)	whole	old	tin	Fall
	Boletus impolitis	whole	fresh	tin	
	Boletus mirabilis	whole	fresh	tin	early Fall, old specimen
	Boletus piperatus	whole	dried	tin	Fall
	Cortinarius sanguineus	whole	fresh	none	sample from Sweden;
		whole	dried	tin	sp. from Oregon; S.L. Barnes 2nd afterbath
	Cortinarius croceofolius	whole	dried	tin	A.H. Smith's specimen
	Cortinarius cinnamomeus	whole	dried	none, alum, tin	early Winter
			fresh	none, alum, tin, iron	

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Echinodontium tinctorium	whole	dried	alum	"Indian Paint Fungus" (sp. from H. Thiers)
	Gyromitra infula	whole	fresh	tin	late Winter
	Lycoperdon caelatum (=*Calvatia*)	spores	aged 3 months	tin	Winter
	Paxillus involutus	whole	fresh	tin	early Fall
	Phaeolus (Polyporus) schweinitzii	whole	fresh	tin	Winter, young sp. with yellow rim
	Pholiota kauffmanii	whole	fresh	tin	greenish orange
	Polyporus perennis (=*Coltrichia*)	whole	dried	tin	late Winter
	Polyporus sulphureus (=*Laetiporus*)	whole	fresh	tin	old growth - woody
	Pulveroboletus ravenelii	tubes	fresh	tin	Fall
BURNT ORANGE	*Boletus aurantiacus*	tubes	fresh	tin	Fall (=*Leccinum versipellus*)
	Boletus grevillei (=*Suillus*)	whole	fresh	tin	Fall
	Boletus piperatus	whole	fresh	tin	
	Chroogomphus rutilus	whole	fresh	tin	
	Cortinarius sp.	whole	fresh	tin	early Spring, found in large ring under pine and madrone (possibly C. *hinnuleus*?)
	Cortinarius cinnamomeus (*orellanus* gr.)	whole	dried	copper, chrome	early Winter; strong dye

	Cortinarius croceofolius	whole	dried & powdered	none	1st afterbath
	Cortinarius sanguineus	whole	dried	copper	sp. from Oregon, from S.D.L.-Barnes
	Gastroboletus turbinatus	whole	fresh	tin	early Fall
	Naematoloma fasciculare	whole	dried	tin	Fall and Winter
	Phaeolus (Polyporus) schweinitizii	whole	fresh	none, alum	sp. without yellow rim - old growth
	Phellinus pseudosenex	whole	dried	tin	Summer, from Barro Colorado Isle, Panama, S.D. Libonati-Barnes
	Polyporus sulphureus (=*Laetiporus*)	whole	old woody	chrome	old growth
	Polyporus tomentosus	whole	fresh & dried	tin	late Winter
RED ORANGE	*Cortinarius croceofolius*	whole	dried,	alum	1st afterbath
	Cortinarius phoeniceus	whole	fresh	tin	3rd afterbath
	Cortinarius sanguineus	whole	dried	tin	sp. from Michigan, from Dr. A.H. Smith, 1st afterbath
	Cortinarius semisanguineus	whole	fresh	tin	variations with other mordants; Winter
YELLOW ORANGE	*Cortinarius phoeniceus* var. *occidentalis*	whole	fresh	iron	5th afterbath
	Gymnopilus junonius (*Pholiota spectabilis*)	whole	fresh	alum	late Fall, early Winter
	Gymnopilus penetrans (*Flammula penetrans*)	whole	fresh	tin	on wool

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Gyromitra infula	whole	fresh	chrome	late Winter
	Naematoloma capnoides	whole	fresh	tin	late Winter
	Paxillus involutus	whole	fresh	chrome	late Winter
	Phaeolus, schewinitzii (Polyporus)	whole	fresh	alum	new growth
	Phylloporus rhodoxanthus	whole	fresh	tin	Fall
	Polyporus sulphureus	whole	fresh	none, alum	old growth - woody
	Rhizopogon sp.	whole	fresh	none & all	Fall - young sp.
GOLD	*Cortinarius annulatus*	whole	dried	tin, chrome, copper	sp. from Dr. A.H. Smith, collected in Michigan 1940
	Cortinarius gentilis	whole	dried	alum, tin	sp. from Dr. A.H. Smith, collected in Washington 1941
	Gymnopilus junonius (=Pholita spectabilis)	whole	fresh	tin	Fall
	Gymnopilus penetrans (=Flammula penetrans)	whole	fresh	none, alum	Fall
	Naematoloma (Hypholoma) fasciculare	whole	fresh	tin,	also known as "Sulphur Tufts"
			dried	alum	
	Phaeolus (Polyporus) schweinitzii	whole	fresh	alum	1st growth with yellow rim; Winter
	Polyporus tomentosus	whole	fresh	tin	Winter, 1st afterbath
	Pulveroboletus ravenelii	tubes	fresh	alum	Fall
	Ungulina fomentaria (=Fomes)	whole	fresh	tin	Winter, 1st year growth
YELLOW	*Boletus edulis*	tubes	fresh	none, alum	"King Boletus"
	Cortinarius annulatus	whole	dried		sp. from Dr. A.H. Smith collected in Michigan 1940
	Cortinarius crocea	whole	fresh	none, alum	sample from Sweden
	Gastroboletus turbinatus	whole	fresh	none	clear color - early Fall
	Gymnopilus junonius (=Pholiota spectabilis)	whole	fresh	alum	Fall
	Lycoperdon sp.	whole	old	none, alum	
	Naematoloma (Hypholoma fasciculare	whole	fresh, dried	none	
	Phaeolus schweinitzii	whole	fresh	none	new growth
	Pholiota kauffmanii	whole	dried	tin	picked in Fall, dried, used for dye 2 years later
	Polyporus sulphureus (=Laetiporus)	whole	woody	hnone	old growth
	Pulveroboletus ravenelii	tubes	fresh	none	Fall
LEMON YELLOW	*Amanita muscaria*	button	fresh	tin	pale lemon yellow
	Boletus aereus	tubes	fresh	alum	light yellow, Fall
	Gastroboletus turbinatus	whole	fresh	none	strong color
	Hygrophorus citrinus	whole	fresh	all	Winter; very pale
	Hygrophorus coccineus	whole	fresh	none, alum, iron	pale yellow

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Hygrophorus miniatus	whole	fresh	none, alum, iron	late Winter
	Hygrophorus puniceus	whole	fresh	iron, tin	
	Naematoloma capnoides	whole	fresh	none	late Winter
	Pholiota kauffmanii	whole	dried	alum, none, chrome, iron	picked fresh, kept for 2 years before dyeing
	Gymnopilus junonius (=*Pholiota spectabilis*)	whole	fresh	none	very bright color
			dried	none, alum, chrome, copper, iron	pale color
	Pulveroboletus ravenelii	tubes	fresh	none	
GREEN YELLOW	*Boletus edulis*	tubes	fresh	alum	early Fall
	Boletus impolitis	whole	fresh	none	
	Cortinarius annulatus	whole	dried	copper	A.H. Smith's specimen 1940
	Cortinarius cotoneus	whole	fresh	chrome	early Winter; clear color almost chartreuse
	Gymnopilus penetrans (=*Flammula penetrans*)	whole	fresh	iron	
	Hygrophorus coccineus	whole	fresh	chromes & copper	
	Hygrophorus miniatus	whole	fresh	chrome, copper	
	Hygrophorus psittacinus	whole	fresh	chrome	picked January during a dry Winter
	Hygrophorus puniceus	whole	fresh	chrome	late Winter, also copper
	Pholiota kauffmanni	whole	dried	copper	picked fresh, dried 2 years
			fresh	iron	
	Polyporus sulphureus (=*Laetiporus sulphureus*)	whole	fresh	tin	1st year growth
	Pulveroboletus ravenelli	tubes	fresh	chrome, copper	early Winter; clear color
MUSTARD	*Boletus edulis*	tubes	fresh	copper, iron	early Fall
	Boletus impolitis	whole	fresh	chrome	
	Boletus mirabilis	whole	fresh	alum, none	
	Boletus piperatus	whole	fresh	none, alum	
	Cortinarius cinnamomeus	whole	dried	iron	
	Cortinarius cotoneus	whole	fresh	copper	early Winter
	Gastroboletus tubinatus	whole	fresh	alum	
	Gymnopilos junonius (=*Pholiota spectabilis*)	whole	fresh	chrome, tin	Fall - Winter
		whole	dried	tin	
	Gymnopilus penetrans (=*Flammula penetrans*)	whole	fresh	chrome	
	Hygrophorus conicus	whole	aged	tin	picked fresh - aged 3 months
	Hygrophorus psittacinus	whole	fresh	tin	dry Winter - in January
	Leccinum scabrum	tubes	fresh	tin	
	Naematoloma fasciculare (=*Hypholoma*)	whole	dried	chrome	Fall

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Phellinus pseudosenex	whole	dried	none, alum	sp. from Panama, S.D.L. - Barnes
	Pholiota kauffmanii	whole	fresh	chrome, copper	
	Polyporus melanopus gr.	whole	dried	copper	
	Polyporus tomentosus	whole	fresh	none,	
	Tricholomopsis rutilans	whole	fresh	none, tin, chrome, copper	1st afterbath
	Ungulina fomentaria (=Fomes)	whole	dried	alum,	old growth
GREEN	*Geoglossum viride*	whole	fresh	all	possibly darker color with larger ratio of mushrooms to wool --
	Hydnellum suaveolans	whole	fresh	tin	early Fall--Largent's sp.
	Hydnum fusco-indicum	whole	dried	tin, copper	
	Hydnum sp. (not *imbricatum*)	whole	old	copper, iron	dyebath aged 3 months
	Merulius tremellosus	whole	fresh	copper	
	Omphalotus olivascens	whole	fresh	iron	Winter
	Phellodon atrata	whole	fresh	copper	early Fall -- Largent's sp.
YELLOW GREEN	*Cortinarius cotoneus*	whole	fresh	none, alum	early Winter
BROWN GREEN	*Collybia acervata*	whole	dried	tin	
	Daldinia grandis	whole	fresh	alum, tin, none copper	Winter
	Daldinia concentrica	whole	fresh	copper, iron, chrome	Winter
	Hydnellum caeruleum	whole	fresh	copper	
	Hydnum imbricatum	whole	fresh	copper	previously cooked, aged 3 months - slimy old
	Hygrophorus conicus	whole	fresh	copper	
	Paxillus atrotomentosus	whole	fresh	chrome, none	early Fall
	Panus torulosus	whole	fresh	chrome, iron	
	Omphalotus olivascens	whole	fresh	chrome	early Fall
	Hydnellum peckii	whole	dried	tin	
	Hydnellum tomentosus	whole		iron	
GREY GREEN	*Collybia acervata*	whole	dried	copper	
	Daldinia concentrica	whole	fresh	none, alum,	Winter - cramp balls, King Alfred's cakes
	Daldinia grandis	whole	fresh	chrome	Winter
	Hydnellum aurantiacum	whole	fresh	iron	Fall

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Hydnellum caeruleum	whole	fresh	chrome	
	Hydnum fusco-indicum	whole	dried	iron	early Fall
	Hydnum imbricatum	whole	fresh	chrome	early Fall - old, shiny
	Hydnellum suaveolans	whole	fresh	slum	early Fall, Largent's sp.
	Merulius tremellosus	whole	fresh	chrome	Winter
	Omphalotus olivascens	whole	dried	none	
	Paxillus atrotomentosus	whole	fresh	chrome, copper	teal blue green, aged 3 months
	Phellodon atrata	whole	fresh	none, alum	late Fall
	Pluteus cervinus	whole	fresh	copper	
	Trametes versicolor (=Coriolus)	whole	fresh	copper	lavendar brackets on ground
BLUE GREEN	*Merulius tremellosus*	whole	fresh	slum, iron, tin	winter (alum) iron-brownish blue green-winter
	Hydnellum aurantiacum	whole	fresh	iron	early Fall
	Hydnellum caeruleum	whole	fresh	iron	early Fall, Largent's sp.
	Omphalotus olivascens	whole	fresh	tin chrome	dark blue green on N.Z. wool
	Panus torulosus	whole	fresh	tin	
	Phellodon atrata	whole	fresh	chrome	dark blue on N.Z. wool Largent's sp. early Fall
SAGE GREEN	*Daldinia concentria*	whole	fresh	tin	"cramp balls," King Alfred's cakes
	Hydnellum fusco-indicum	whole	fresh	alum, iron	early Fall, Largent's sp.
	Hydnellum regium	whole	fresh	copper, tin, chrome	early Fall, Largent's sp.
	Hydnellum suaveolans	whole	fresh	copper, chrome	early Fall, Largent's sp.
	Hydnellum sp.	whole	fresh	none, alum, tin, chrome	bluish sage green dusty sage—green, greenish sage green - on ground and branches
	Leccinum scabrum	tubes	fresh	chrome, copper	
	Phellodon atrata	whole	fresh	tin	
	Stropharia ambigua	whole	fresh	copper	Fall, Winter, pale—aged 3 months
FOREST GREEN	*Hydnellum aurantiacum*	whole	fresh	iron	
	Hydnellum caeruleum	whole	fresh	iron	
	Hydnellum peckii	whole	fresh	chrome, tin	Winter after rains
		whole	dried	iron	
	Hydnellum regium	whole	fresh	iron	dark color
	Hydnellum sp.	whole	fresh	iron	Winter growing on ground and branches
	Hydnum imbricatum	whole	fresh, old	copper	

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Omphalotus olivascens	whole	fresh	chrome	
		whole	dried	iron, chrome	
	Polyporus leucomelas	whole	fresh	iron, none, alum	Kurotake - Winter
	Paxillus atromentosus	whole	fresh	iron	
			aged	iron, none	
OLIVE GREEN	*Boletus aereus*	tubes	fresh	copper, iron	Fall
	Boletus eastwoodiae	whole	fresh	iron	Fall
	Boletus grevillei (=Suillus grevillei)	tubes	fresh	copper, chrome	early Fall, pale color
	Boletus impolitis	whole	fresh	copper, iron	
	Boletus mirabilis	whole	fresh	copper, iron	
	Boletus piperatus	whole	fresh	iron	Fall
	Cortinarius cotoneus	whole	fresh	iron, tin	early Winter
			dried	chrome	light color

	Gastroboletus turbinatus	whole	fresh	iron	early Fall
	Hygrophorus conicus	whole	aged	tin	picked fresh - aged 3 months
	Hydnellum aurantiacum	whole	fresh	copper	early Fall, Largent's sp.
	Hydnum scabrosum	whole	fresh	tin, alum	early Fall
	Hydnellum fuscoindicum	whole	fresh	chrome, copper, iron	Winter
	Hydnellum peckii	whole	fresh	chrome, tin	
	Phellodon niger	whole	fresh	iron	
	Pulveroboletus ravenelii	tubes	fresh	copper	Winter
	Thelephora palmata	whole	fresh	iron	Fall
				tin	
GREEN GRAY	*Amanita muscaria*	whole	fresh	copper	Fall, Winter; very pale color
	Clavaria aurea	whole	fresh	copper	Winter
	Hydnellum caeruleum	whole	fresh	copper	Fall; slightly yellowed grey-green
	Hydnellum scrobiculatum	whole	fresh	none	early Spring
	Hydnum imbricatum	whole	dried	copper, iron	S.D.L. - Barnes, 10 sp.
	Hygrophorus conicus	whole	aged 3 months	iron	Winter
	Laccaria amethystina	whole	fresh	copper	Winter
	Lepista nuda	whole	fresh	chrome, copper	very light - virtually no color
	Phellodon niger	whole	fresh, old	chrome, tin, alum	Fall

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Pluteus cervinus	whole	fresh	chrome	Winter
	Stropharia ambigua	whole	fresh	chrome	late Fall, very light
		whole	aged 3 months	alum, none chrome, iron	
	Trametes versicolor (=Coriolus versicolor)	whole	fresh	chrome	Winter; silvery green-grey
	Hydnum fuscoindicum	whole	dried	alum	
BLUE GREY	*Hydnellum caeruleum*	whole	fresh	alum, tin	light blue-grey-green with alum
	Hydnum imbricatum	whole	dried	chrome	S.D.L. - Barnes, sp. from Washington
	Hydnum sp. (not *imbricatum)*	whole	aged	alum, chrome	dyebath aged 3 months
WARM GREY	*Agaricus arvensis*	whole	fresh	iron	Fall
	Agricus campestris	whole	fresh	iron	Fall; "Meadow Mushroom"
	Agaricus sylvaticus	whole	fresh	iron	Fall; "The Sylvan Agaricus"
	Boletus edulis (probably)	stipe	slimy, old	iron	black, wormy when found
	Coprinus comatus	whole	fresh	alum	Fall, Winter
	Hydnellum peckii	whole	dried	alum	
			fresh		Winter
	Hydnellum regium	whole	fresh	none, alum	Winter

	Hydnellum suaveolans	whole	fresh	none	Fall
	Hydnum fuligineoviolaceum	whole	fresh	iron, alum	Fall
	Hydnum fuscoindicum	whole	dried	none	
	Hydnum imbricatum	whole	fresh	none	
	Inocybe maculata	whole	fresh	iron	Winter
	Leccinum scabrum	tubes	fresh	iron	
	Omphalotus olivascens	whole	fresh	none	
	Trametes versicolor (=Coriolus)	whole	fresh	none, alum, tin	lavender brackets on ground
BLUE	*Hydnum imbricatum*	whole	dried	tin	
		whole	old-3 months	alum, tin	Winter, early Spring, fungus aged in dyebath seemed to produce more color, brightest, purest blues extracted from original dyebath—exhausts easily
NAVY BLUE	*Hydnum stereosarcinon*	whole	fresh	tin	Largent's sp. - early Fall
	Hydnum sp. (not *H. imbricatum)*	whole	old	tin	dyebath had been used 3 previously, Prussian blue with less quantity of fungus
	Paxillus atrotomentosus	whole	fresh	tin	early Fall
LIGHT BLUE	*Hydnellum caeruleum*	whole	fresh	iron	
	Hydum imbricatum	whole	old-3 months	chrome	soft blue from previously cooked dyebath

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
BLUE	*Hydnellum caeruleum*	whole	fresh	alum	
GREY	*Hydnum imbricatum*	whole	old	alum, tin	from exhausted dyebath
	Hydnum stereosarcinon	whole	fresh	alum, tin, iron	early Fall, lighter blue then with tin
	Phellodon niger	whole	fresh	none, iron	Winter
	Phellodon atrata	whole	dried	iron	possibly more blue dried than fresh
	Trametes versicolor	whole	fresh	iron	
	Phellodon atrata	whole	dried	iron	possibly more blue dried than fresh
	Trametes versicolor (=*Coriolus*)	whole	fresh	iron	Winter
PURPLE	*Cortinarius californicus*	whole	dried	chrome	chrome added to dyebath
	Cortinarius croceofolius	whole	dried, powdery	copper	sp. from Seattle - S.L.B.
	Cortinarius sanguineus	whole	old, frozen	none	dyed wool sample sent from Sweden by Carla Sundstrom
	Cortinarius phoeniceus var. *occidentalis*	whole	dried	copper	greyed purple
	Omphalotus olivascens	whole	old-fresh, dried	alum	Winter, into lavenders with afterbaths
		whole	old-fresh, dried	chrome	greyed purple, into greens afterbaths
		whole	old-fresh, dried	iron	blackish purple, into greens with afterbaths
	Panus torulosus	whole	fresh	none,	greyed purples, late Fall
	Paxillus atrotomentosus	whole	fresh	alum	early Fall
BLUE PURPLE	*Cortinarius phoeniceus* var. *occidentalis*	whole	frozen, fresh	iron	also fresh and dried
	Omphalotus olivascens	whole	dried	alum	diluted first bath
LAVENDER	*Cantharellus clavatus* (=*Gomphus*)	whole	fresh	iron	"Pigs Ears"
	Clavaria sp. (orange)	whole	fresh	iron	"Coral Mushroom"
	Clavariadelphus truncatus	whole	fresh	iron	good, strong color
	Cortinarius sp.	whole	fresh	chrome	rosy lavender
	Gomphus floccosus	whole	fresh	iron	"Wooly Chanterelle"
	Omphalotus olivascens	whole	fresh	alum	2nd after bath 1st afterbath
	Paxillus atromentosbous	whole	aged	alum	
	Russula sanguinea	whole	fresh	chrome	very pale; Fall
MAUVE	*Cortinarius californicus*	whole	dried	chrome, iron	sp. collected by A.H. Smith 10/22/37, in Blue River, Oregon; also Largent's ID. - Mendocino, California sp.
	Cortinarius croceofolius	whole	dried & powdered	none	sp. S.D.L. - Barnes, University of Washington

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
BURGUNDY	*Cortinarius aureifolius*	whole	semi-dried	copper	Winter, light color
	Cortinarius croceofolius	whole	dried, powdered	chrome	1st afterbath, sp. from Seattle, Washington
				copper	1st afterbath
	Cortinarius phoeniceus var. *occidentalis*	whole	fresh	chrome	also, 1st and 2nd afterbaths
	Cortinarius sanguineus	whole	dried	chrome	sp. from Oregon
ROSE	*Cortinarius croceofolius*	whole	dried & powdered	chrome	1st afterbath
	Cortinarius phoeniceus var. *occidentalis*	whole	fresh or dried	alum	1st, 2nd and 3rd afterbaths
	Cortinarius sanguineus	whole	dried	chrome	A.H. Smith sp.
DUSTY ROSE	*Chroogomphus (Gomphidius) vinicolor*	whole	frozen, fresh	alum	late Winter, rose pink
	Cortinarius californicus group	whole	dried	copper	both Oregon and Mendocino, CA.
	Cortinarius aureifolius	whole	semi-dried	chrome	4th afterbath
BROWN	*Agaricus campestris* (maybe *A. bisporus*)	whole	fresh	tin	domesticated mushroom you buy in store
	Agaricus pattersonae	whole	fresh	tin, iron	fresh

Agaricus sylvaticus	gills	fresh	chrome, copper	
Boletus eastwoodiae	whole	fresh	copper	Fall
Boletus edulis	whole	fresh	copper	early Fall
Chroogomphus (Gomphidius vinicolor)	whole	dried,	iron	1st afterbath - light brown deepest color in Fall
Cortinarius croceofolius	whole	dried, powdered	iron	1st afterbath - light brown
Cortinarius phoeniceus var. *occidentalis*	whole	fresh	iron	Fall, Winter; 1st afterbath
Daldinia grandis	whole	fresh	iron	
Fometopsis cajanderi (=Fomes)	whole	fresh	all	collected December after rains; variety deep shades brown for several baths
Echinodontium tinctorium	whole	dried	chrome	
Gomphidius glutinosus	whole	fresh	tin, alum, chrome	collected Fall
Gomphidius subroseus	whole	fresh	tin	early Fall
Hydnellum peckii	whole	dried	none	Winter; 1st bath, afterbaths
Hydnellum tomentosus	whole	fresh	alum	afterbaths all shades of brown
Hydnellum zonatum	whole	dried	none, alum, copper, iron	Winter
Hydnum fennicum	whole	fresh	alum, copper, iron	Winter
Hygrophorus hypothejus	whole	fresh	iron	

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Lycoperdon sp.	whole	fresh	none	and all other mordants
	Lydoperdon caelatum (=Calvatia)	spores	very old	chrome	
	Pisolithus tinctorius	whole	dried	chrome	
	Polyporus tomentosus	whole	fresh, dried	copper	Winter
	Scleroderma sp.	spores	fresh	all	Fall; "Common Puffball"
	Thelephora terrestris	whole	fresh	none, alum, copper, iron	found on the ground, and on the stems of salal and huckleberry
	Rhizopogon sp.	whole	old	all	Winter
	Tricholomopsis rutilans	whole	fresh	alum & chrome	Fall, Winter
	Ungulina fomentaria	whole	fresh	iron	collected Winter, 1st year growth, dried 1 month
		whole	dried	copper	
DARK BROWN	*Agaricus augustus*	gills	fresh	tin	a deep chocolately brown, early Summer
	Agaricus sylvaticus	gills	fresh	tin	late Fall
	Chroogomphus (Gomphidius) vinicolor	whole	fresh	copper	Fall
	Gomphidius glutinosus	whole	fresh	copper	Fall
	Gyromitra infula	whole	fresh	iron	Fall

	Hydnum fennicum	whole	fresh	chrome	Winter, greenish hue
	Hydnellum peckii	whole	dried	copper	
	Hydnellum scrobiculatum	whole	fresh	none, chrome copper	early Fall
	Hydnellum tomentosus	whole	fresh	iron	
	Hygrophorus hypothejus	whole	fresh	iron	
	Phaelous (Polyporus) schweinitzii	whole	fresh	iron	old, woody, no yellow rim
	Pisolithus tinctorius	whole	dried	tin	very intense excellent color through several afterbaths
	Polyporus sulphureus	whole	old, woody	iron	old growth
	Tricholomopsis rutilans	whole	fresh	tin, copper	Winter
	Ungulina fomentaria (=Fomes)	whole	dried	iron	older growth
GREY BROWN	*Chroogomphus (Gomphidius) vinicolor*	whole	fresh	iron	collected in Fall
	Cortinarius violaceus	whole	fresh	copper	early Fall
	Gomphidius glutinosus	whole	fresh	iron	
	Hydnum fuligineoviolaceum	whole	fresh	chrom, tin, copper	Fall
	Panus torulosus	whole	fresh	alum, none	

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
RED BROWN	*Chroogomphus (Gomphidius) vinicolor*	whole	fresh, frozen	chrome	collected late Winter lighter shades than in Fall
	Cortinarius phoeniceus var.*occidentalis*	whole	fresh	copper	Winter and Fall
	Hygrophorus hypothejus	whole	fresh	copper, chrome	
	Phaeolus (Polyporus) schweinitzii	whole	fresh	copper	Fall; with yellow rim
	Phaeolus (Polyporus) schweinitzii	whole	old, dried	chrome, copper	Fall; without yellow rim
	Polyporus sulphureus	whole	fresh	copper	old growth - woody
	Polyporus tomentosus	whole	dried	chrome	Winter
CINNAMON	*Chroogomphus (Gomphidius) vinicolor*	whole	fresh	tin	darker dyes when collected in Fall rather than in Winter
	Cortinarius aureifolius	whole	semi-dried	tin	light cinnamon dye
	Cortinarius cinnamomeus	whole	fresh	chrome, copper	
	Cortinarius croceofolius	whole	dried	copper, chrome	powdered
	Cortinarius semisanguineus	whole	dried	chrome	A.H. Smith's specimen
	Cortinarius sanguineus	whole	dried	copper	A.H. Smith's specimen
	Echinodontium tinctorium	whole	dried	copper	
	Gastroboletus turbinatus	whole	fresh	chrome	early Fall, alum lighter color
	Hydnum fennicum	whole	fresh	none	Winter
	Hygrophorus hypothejus	whole	fresh	none	
	Leccinum scabrum	tubes	fresh	chrome	Fall; light cinnamon
	Naematoloma fasciculare	whole	fresh	chrome	Fall or Winter
	Phaeolus (Polyporus) schweinitzii	whole	fresh	chrome	Winter; with yellow rim, young
	Phaeolus (Polyporus) schweinitzii	whole	old	alum	Winter; without yellow rim
	Tricholomopsis rutilans	whole	fresh	chrome	Fall, Winter
GOLDEN BROWN	*Agaricus arvensis*	whole	fresh	tin	
	Agaricus augustus	whole	dried	tin	specimen dried 1 year
	Boletus edulis	whole	fresh	chrome	early Fall
	Gyromitra infula	whole	fresh	copper	Winter
	Hydnellum tomentosus	whole	dried	none	
	Inocybe maculata	whole	fresh	tin	early Spring; a light golden brown
	Lenzites betulina	whole	fresh	all	found in February growing on a log
	Naematoloma capanoides	whole	fresh	copper	
	Naematoloma fasciculare	whole	fresh	copper	Fall or Winter
	Pisolithus tinctorium	whole	dried	iron	
	Polyporus tomentosus	whole	fresh	none, alum, chrome, iron	
			dried	none, alum	
	Tricholomopsis rutilans	whole	fresh	alum	Winter

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Ungulina fomentaria (=Fomes)	whole	dried	alum	dried one month
YELLOW BROWN	*Agaricus augustus*	gills	fresh	copper	found early Summer
	Agaricus campestris	gills	fresh	tin	old specimen
	Boletus piperatus	whole	resh	chrome	
	Cortinarius sp.	whole	fresh	all	possibly *C. hinnuleus*, large ring under pine and madrone
	Gastroboletus turbinatus	whole	fresh	copper	early Fall
	Lycoperdon sp.	whole	fresh	iron	very old
	Naematoloma fasciculare	whole	fresh	copper	
	Phellinus pseudosenex	whole	dried	chrome, copper	specimen Panama, S.D.L. - Barnes
	Pholiota spectabilis	whole	fresh	copper	
	Polyporus melanopus gr.	whole	dried	alum	light color
	Polyporus tomentosus	whole	dried	iron	dark color
	Stropharia ambigua	whole	fresh	tin	pale color - aged 3 months
	Tricholomopsis rutilans	whole	fresh	iron, chrome, copper	Winter
	Ungulina fomentaria (=Fomes)	whole	dried	chrome	older growth
GREEN BROWN	*Boletus piperatus*	whole	fresh	chrome, copper	
	Craterellus cornucopioides	whole	fresh	tin	light shade of green-brown Winter, early Spring
	Hydnellum peckii	whole	fresh	copper	Winter - deep, dark green-brown
	Hydnellum scrobiculatum	whole	fresh	alum	
	Hydnellum tomentosus	whole	fresh	chrome, tin	
	Hydnellum zonatum	whole	fresh or dried	chrome	Winter
	Hydnellum sp.	whole	fresh	copper	growing on branches and on ground; Winter
	Hydnum fuscoindicum	whole dried	fresh copper	copper	Winter
	Naematoloma capnoides	whole	fresh & dried	iron	
	Phellinus pseudosenex	whole	dried	iron	Sp. Panama - S.D.L. - Barnes
	Polyporus melanopus gr.	whole	dried	tin	light color
	Polyporus tomentosus	whole	fresh	iron	1st afterbath (light color)
	Thelephora terrestris	whole	fresh	tin, chrome	on ground and around stems of salal, huckleberry - Winter
GREEN TAN	*Collybia acervata*	whole	dried	chrome	
	Hericium erinaceus	whole	fresh	copper	
	Hygrophorus conicus	whole	fresh	none, chrome copper	dyebath aged 3 months
	Inocybe maculata	whole	fresh	copper	

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Lycoperdon caelatum (=*Calvatia*)	whole	fresh	copper, chrome	
	Omphalotus olivascens	whole	dried	tin	
	Paxillus involutus	whole	fresh	iron	
	Polyporus melanopus gr.	whole	dried	iron	
	Polyporus perennis (=*Coltrichia*)	whole	dried	copper	
	Stropharia ambigua	whole	fresh	tin	dyebath
	Trametes versicolor (=*Coriolus*)	whole	fresh	copper	
TAN	*Agaricus arvensis*	gills	fresh	copper, chrome	
	Agaricus augustus	gills	fresh	alum	pink-tan with no mordant; early Summer
	Agaricus bisporus	whole	fresh	all	domesticated mushroom you can buy in store
	Agaricus campestris	cap	fresh	copper, chrome, none	old
	Agaricus sylvaticus	whole	fresh	alum	also without mordants
	Astraeus pteridis	whole	fresh	all	Spring; more orange with alum and tin
	Boletus edulis	stipe	old	tin	black and wormy specimen, but upright

Boletus mirabilis	whole	old, fresh	chrome	early Fall
Cantharellus infundibuliformis	whole	fresh	tin	also iron
Clavariadelphus truncatus	whole	fresh	tin	early Fall
Coprinus comatus	whole	fresh	tin	"Shaggy Mane"
Cortinarius croceofolius	whole	dried, powdered	iron	Smith's specimen
Cortinarius sanguineus	whole	dried	none, iron	sp. from A.H. Smith
Cortinarius violaceus	whole	fresh	tin, chrome	
Hydnellum peckii	whole	fresh	none	
Craterellus cornucopioides	whole	fresh	copper	beiges with other mordants
Echinodontium tinctorium	whole	dried	iron	
Gomphidius glutinosus	whole	fresh	none	Fall - Winter
Gomphidius subroseus	whole	fresh	copper	
Hericium erinaceus	whole	fresh	tin	sp. several weeks old; Winter
Hydnellum caeruleum	whole	fresh	none	
Hydnum stereosarcinon	whole	fresh	alum	aged 3 months
Hygrophorus conicus	whole	fresh	chrome	Winter
Inocybe maculata	whole	fresh	chrome, iron	
Lactarius sanguifluus	whole	fresh	copper, tin	young specimen, Fall
Leccinum scabrum	tubes	fresh	iron	darker with chrome, early Fall
Naematoloma capnoides	whole	fresh	chrome	early Fall
Paxillus involutus	whole	fresh	copper	early Fall

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Phylloporus rhodoxanthus	whole	fresh	copper, iron	Fall
	Pluteus cervinus	whole	fresh	chrome	Winter
	Polyporus perennis (=Coltrichia)	whole	dried	iron, none, alum	
	Thelephora palmata	whole	fresh	copper, chrome, iron	late Fall
	Tricholomopsis rutilans	whole	fresh	none	Winter
BEIGE	*Agaricus augustus*	whole	dried 1 year	all but tin	warm, silvery beiges
	Amanita muscaria	whole	fresh	alum	also iron
	Cantharellus cibarius	whole	fresh	alum	also iron, very pale
	Chroogomphus (Gomphidius) vinicolor	whole	fresh frozen	tin	warm beige in late Winter
	Clavariadelphus truncatus	whole	fresh	copper	early Fall
	Collybia acervata	whole	dried	iron	
	Cortinarius cotoneus	whole	dried	none, alum, iron, tin, copper	
	Cortinarius semisanguineus	whole	fresh	alum	exhausted 1st afterbath
	Gomphidius subroseus	whole	fresh	none, alum, chrome, iron	Fall and Winter
	Gyromitra infula	whole	fresh	none	
	Helvella californicus	whole	fresh	none	colorless with mordants
	Hericium erinaceus	whole	fresh	none, alum, chrome,	Fall and Winter
	Hydnum scabrosum	whole	fresh	none	
	Hydnum repandum	whole	fresh	alum	"Hedgehog mushroom"
	Hygrophorus conicus	whole	fresh	none, alum, iron	
	Inocybe maculata	whole	fresh	none, alum	
	Lactarius deliciosus	whole	fresh	alum	also iron - very pale
	Lactarius sanguifluus	whole	fresh	chrome, none	also alum and iron, but very pale
	Lycoperdon caelatum (=Calvatia)	whole	fresh	none	also alum and iron
	Merulius tremellosus	whole	fresh	none	Winter
	Naematoloma capnoides	whole	fresh	alum	also chrome
	Paxillus involutus	whole	fresh	none, alum	early Fall
	Phaeolus (Polyporus) schweinitzii	whole	fresh	none	Winter, sp. without

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Phylloporus rhodoxanthus	whole	fresh	none, alum, chrome	Fall
	Polyphorus perennis	whole	dried	alum, none, chrome, iron	
	Polyporus sulphureus (=*Laetiporus*)	whole	fresh	iron	1st year growth
	Polyporus melanopus gr.	whole	dried	none, chrome	
	Pluteus cervinus	whole	fresh	none, alum	
	Ungulina fomentaria (=*Fomes*)	whole	dried	none	gathered Winter, dried one month before
PURPLE BLACK	*Cortinarius croceofolius*	whole	dried powdered	iron	sp. from Seattle, 1st bath
	Omphalotus olivascens	whole	fresh	copper	
	Panus torulosus	whole	fresh	copper	late Fall
	Paxillus atrotomentosus	whole	fresh & aged	copper	early Fall
BLUE BLACK	*Cortinarius phoeniceus* var. *occidentalis*	whole	dried	iron	
	Hydnum fennicum	whole	fresh	tin	Fall
	Omphalotus olivascens	whole	fresh	copper	
BROWN BLACK	*Bulgaria inquinans*	whole	fresh	all	fungus has rubbery consistency
	Hydnellum scrobiculatum	whole	fresh	iron	
	Hydnellum zonatum	whole	fresh or dried	copper	Winter
	Omphalotus olivascens	whole	dried	copper	Winter, afterbaths go into browns
	Phaeolus (Polyporus) schweinitzii	whole	fresh, new growth	iron	Winter, mature specimen with yellow rim - new growth
	Pisolithus tinctorius	whole	fresh	chrome, tin, copper	Fall; deep, intense color with first bath and several after-baths
			dried	alum, none	
	Tricholomopsis rutilans	whole	fresh	copper iron	early Spring
BLACK	*Hydnellum peckii*	whole	fresh	copper	deeper color in afterbath
	Hydnellum scrobiculatum	whole	fresh	tin	early Fall
	Hydnellum zonatum	whole	fresh, dried	tin	Winter
	Omphalotus olivascens	whole	old	copper	
	Pisolithus tinctorius	whole	fresh	none, alum, iron	

COLOR	MUSHROOM	PART	CONDITION	MORDANT	REMARKS
	Polyporus leucomelas (=Boletopsis)	whole	fresh	chrome tin	Winter, "kurotake"
GREY	*Agaricus augustus*	gills	fresh	chrome, iron	early Summer; warm greys
	Amanita muscaria	whole	fresh	iron	Winter
	Clavaria aurea	whole	fresh	iron	"Coral mushroom"
	Clavariadelphus truncatus	whole	fresh	chrome	late Fall
	Coprinus comatus	whole	fresh	copper	dark grey
	Cortinarius violaceous	whole	fresh	none	early Fall, pale color
	Hydnellum peckii	whole	fresh	alum	
	Hydnum sp. (not *H. imbricatum*)	whole	dried	none,	S.D.L. - Barnes sp. and ID.
	Hydnum imbricatum	whole	dried	none, alum	S.D.L. - Barnes sp. and ID.
	Hydnum fuligineoviolaceum	whole	fresh	none	late Fall;
	Hygrophorus conicus	whole	aged 3 months	none, chrome, tin, iron	
	Paxillus atromentosus	whole	fresh	tin	dark grey - aged
	Pluteus cervinus	whole	fresh	iron	Winter
	Polyporus sulphureus (=Lateiporus)	whole	fresh		Fall

The following three charts on samples of mushrooms show the variety of dye colors obtained from individual species.

Cortinarius phoeniceus var. ***occidentalis***

Fresh	NONE	ALUM	CHROME	TIN	COPPER	IRON
Dyebath	salmon pink	light wine red	burgundy	blood red	greyed burgundy	blue purple purple
1st afterbath	apricot	rose	dusty rose	orange red	brown	grey brown
2nd afterbath	apricot	rose	light red brown	red	cinnamon	light brown
3rd afterbath	apricot	lighter rose	dusty rose	red orange	cinnamon	tan
4th afterbath	apricot	salmon pink	cinnamon	apricot	lighter cinnamon	cinnamon
Dried	apricot	wine red	burgundy	red	dusty rose	greyed blue purple
Dried and powdered	light wine red	darker wine red	red	burgundy	greyed purple	light purple black
Frozen fresh 1 yr old	rose	dusty rose	burgundy	blood red	purple	blue purple

Cortinarius phoeniceus var. *occidentalis*

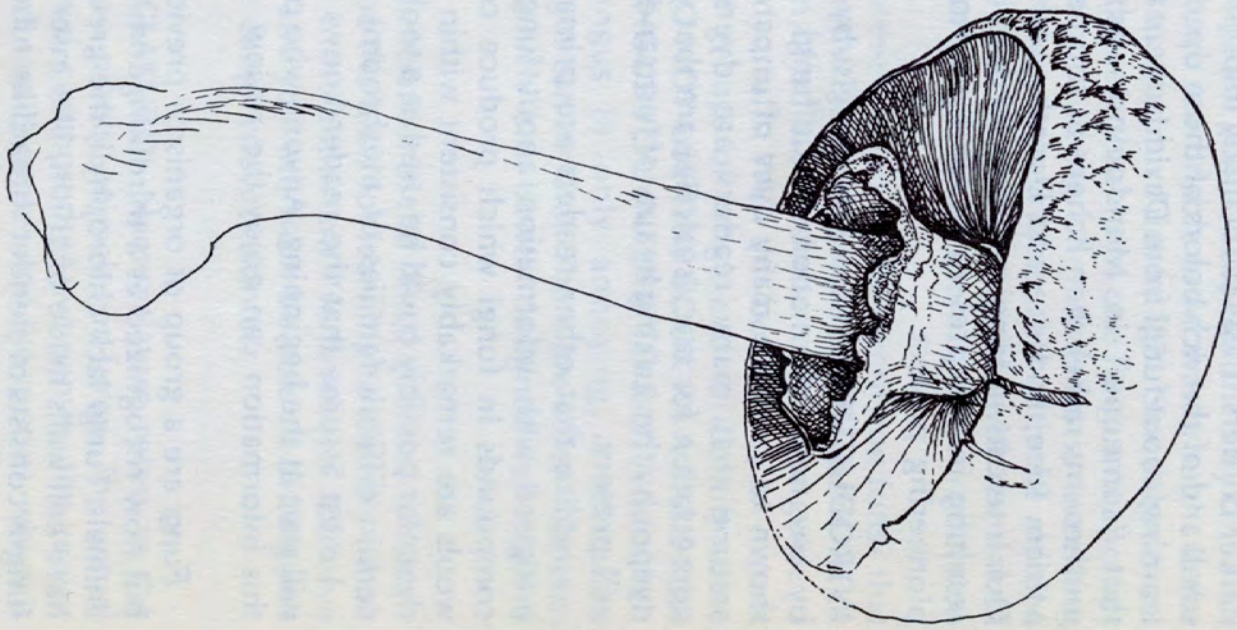
DRIED SPECIMENS FROM DIFFERENT AREAS

	NONE	ALUM	CHROME	TIN	COPPER	IRON
SDL-Barnes Cooperlake Washington	apricot	light wine red	burgundy	red	dusty rose	tan
A.H. Smith's Idaho	mustard	burnt orange	warm burgundy	orange red	cinnamon	tan
Mendocino, California	greyed apricot	light wine red	burgundy	red	deep mauve	greyed blue purple

Phaeolus schweinitzii

4" x 2½" piece of NEW GROWTH

	NONE	ALUM	CHROME	TIN	COPPER	IRON
one hour DYE BATH	lemon yellow	yellow	(mustardy) gold	deep orange	mustard	olive green
two hour FIRST AFTER BATH	yellow	(mustardy) yellow	burnt orange	(burntish) orange	golden brown	olive green
SECOND AFTER BATH	pale yellow	paler yellow	(mustardy) yellow	yellow orange	lighter mustard	green
THIRD AFTER BATH	yellow	yellow	mustard	orange	lighter mustard	green



Agaricus silvaticus

IDENTIFYING AND CLASSIFYING MUSHROOMS FOR COLOR

by Susan D. Libonati-Barnes

PREFACE My awareness of dyes from fungi had roots in the discovery that lichens have traditionally been used as dyestuff for wool. I can remember my visits to Dorothy Beebee's sunny sitting room in San Francisco where she had skeins of lichen-dyed wools hanging in the darker corners. I was particularly impressed by her appreciation of the smell and of the rich colors of those dyed wools. Later, when I was first learning about fungi from David Largent in northern California, I heard that "someone" in Mendocino was experimenting with actual mushrooms rather than lichens as sources of dye. The "someone" was Miriam Rice, and she and Dorothy and I eventually met each other. Our interests in fungi and natural dyes have converged and mingled, resulting in the present book. I am honored to have a part in this pioneering project.

INTRODUCTION I am a mycologist by profession and am fascinated by any new information about fungi. Mushrooms have now been shown to produce many dyes of unparalleled fastness, variety, and I assume that many readers are dyers and/or weavers, with an appreciation for the visual. Beware that you are not diverted from the dyepot by the striking beauty of form and color that your fungal harvest will present.

I realize that other readers are primarily mycologist or naturalists, intrigued with information about fungal dyes. It appears that the compounds in fungi which produce color on variously mordanted wools are remarkably consistent within closely related groups. Thus, dyecolor possibly could be used as a tool to discern the relationships in certain difficult families of mushrooms.

I must assume that the reader knows nothing about fungi, and so I will start at the beginning. Anyone who previously has been exposed to this information can enjoy the review.

Fungi are a group of organisms previously classified with the plants but now recognized as a third kingdom separate from both plants and animals. Fungi lack chlorophyll, the green pigment of land plants, and have cell walls made of chitin, like insect exoskeletons. The body of a fungus consists of slender threadlike tubes, finer than a cobweb, which branch and spread throughout a food source like dung, or a dead tree trunk, or soil with bits of leaf in it, or oranges in the refrigerator. The threads (called *hyphae*) exude digestive enzymes which break down the

surrounding food into absorable size particles. The fungus consumes these particles and grows. When sufficient food becomes stored in the web of hyphae, the fungus can produce a reproductive structure. This is the *mushroom* or bracket that we see. Thus, a mushroom is analogous to the fruit on a tree: it is only the reproductive part of a larger organism. The mushroom then produces *spores* which are carried by air currents. When the spores land in an appropriate place, they germinate and grow into a new web of hyphae which will eventually produce more mushrooms.

Historically, the identification of fungi has been a difficult task. In contrast to the classification of green plants, accomplished by Linnaeus during the eighteenth century, no reasonable order was brought to the fungi until the first work of Elias Magnus Fries in 1821. Since that time, our methods of determining the relationship of one fungus to another have become more detailed, utilizing chemical tests, breeding experiments, and details of anatomy discernible only with the aid of a microscope. But Fries' system, based on features visible with the naked eye, was so well organized that we still find it useful as an introduction to fungi.

It is this system which we present as an aid to identifying fungi that are intended for dye experiments. Please be aware that this book is not intended for the identification of edible mushrooms, but as a guide to the dyer interested in fungal dyestuffs. With this book, you can expect to learn to recognize general groups of fungi, and to identify some distinctive dye mushrooms. **DO NOT USE THIS BOOK AS A BASIS FOR IDENTIFICATION OF ANY FUNGUS YOU INTEND TO EAT.** A mistaken identification of a dye fungus in only annoying, a mistaken identification of an edible fungus can be fatal. There are other volumes, listed in the bibliography, which are better designed for such a purpose.

IDENTIFYING FUNGI An appreciation of the visual qualities of fungi: form, color, and texture, will be the basis for learning to identify them. Remembering to look is the most important "remember." Observe critically and with enjoyment and you will soon be able to distinguish the important features of the fungi you encounter.

NAMES OF FUNGI (NOMENCLATURE) Nomenclature refers to the system of bestowing names on plants, animals, or fungi. The actual name of any fungus is a *binomial*, composed of two names: the genus, which corresponds to a person's family name; and the species, which is like a personal name. The name of the genus comes first and is capitalized, and is followed by the specific name, which is not capitalized. These names are both Latinized, and you will find that we

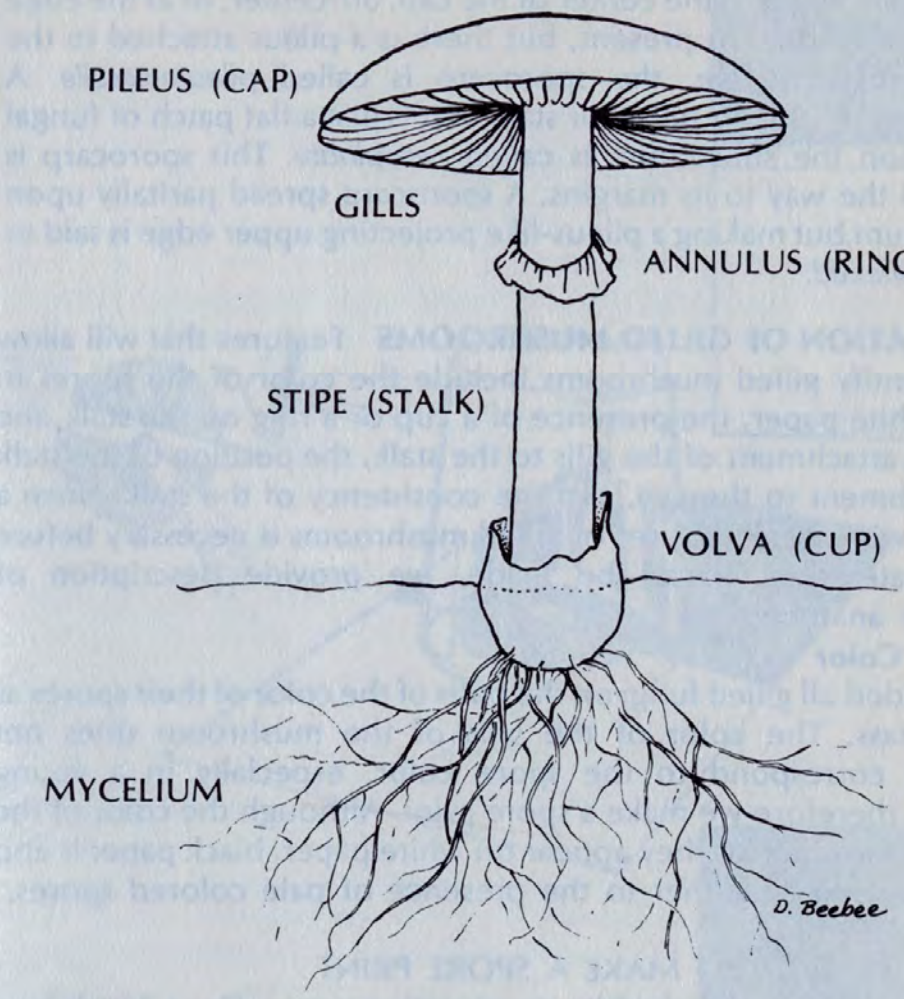
use them for all the fungi in this book. The advantages of this system are these: only one organism has any one combination of names, and the same organism is referred to whenever that name is used. Common names can change meaning from place to place. A group of species which is similar enough is collected into a genus, and groups of related genera are gathered into families. Likewise, similar families are grouped. An example of the classification of *Amanita muscaria* will illustrate the categories of classification.

Kingdom:	Fungi (other kingdoms are plants, animals, bacteria, etc.)
Division:	Eumycota (true fungi)
Subdivision:	Basidiomycotina (fungi with basidia)
Class:	Hymenomycetes (basidia in a layer)
Subclass:	Holobasidiomycetidae (basidia are one-celled and club-shaped)
Order:	Agaricales (gill fungi)
Family:	Amanitaceae (white spores, free gills, veils)
Genus:	*Amanita*
Species:	*Amanita muscaria* (red cap with white warts)

The name of the genus and of the species is always underlined or italicized. Names are given to previously undescribed fungi after a study of the related fungi which are already known. A new name must not have been previously used in the particular combination, and should be descriptive and not confusing, if possible.

It is important to remember that the categories of classification are human constructs by which we try to reflect the relatedness of the organisms we study. As we learn more about the fungi, we wish to revise our schemes of relatedness. Thus, the names of categories can change. In addition, we wish to give credit for the description of a certain mushroom to the earliest describer. To do this, we use the name for that mushroom which was given by the earliest author (after an agreed upon cutoff date: 1821, Fries' *Systema Mycologicum*, for the gilled mushrooms). Sometimes this practice necessitates the abandonment of a name in common use, and substitutes a lesser known, but earlier name. These changes, though beneficial in intent, are of course confusing to the casual observer. Finally, different people have different opinions regarding the relations of one fungus to another, and subdivide them differently. In the absence of many fossils to shed light upon "which-fungus-was-alive-when," we must make surmises; and various mycologists will most often surmise differently and vehemently.

GROUPS OF FUNGI Since dyes are obtained from a variety of fungi, the following discussion will serve to familiarize the reader with the groups likely to be encountered.



The ***gilled mushroom*** is a familiar fungal reproductive structure. It consists of a cap *pileus*), seated upon a stalk (*stipe*), which is connected to the web of feeding hyphae (*mycelium*). If you invert a mushroom, under the cap you will see blade-like gills (*lamellae*) radiating like the spokes of an unbrella. It is on the surfaces of these gills that the spores are produced. In addition to cap, gills, and stalk, mushroom can have a cup (*volva*) at the base of the stalk, and a ring (*annulus*) around the stalk. Although all of these structures are important for mushroom identification (more detail later), our founder Fries determined that the presence of blade-like gills was what really made a mushroom a mushroom. If you invert the fruiting bodies of fungi other than mushrooms, you will find that the system of gills is replaced by a layer of spines, tubes, or veins. The shape of this spore-bearing layer is one of the most important criteria for identifying any fungus, and it is used to delimit the major groups.

SPOROCARP TYPES Some terms describing the types of fruiting bodies will be useful in reading the descriptions of individual dye fungi. A sporocarp can be composed of a cap and a stalk *pileate-stipitate*. The stalk can be attached in the center of the cap, off-center, or at the edge of the cap. If no stalk is present, but there is a pileus attached to the substratum by its edge, the sporocarp is called *pileate-sessile*. A sporocarp which has no pileus or stalk, but is just a flat patch of fungal material upon the substratum is called *resupinate*. This sporocarp is attached all the way to its margins. A sporocarp spread paritally upon the substratum,but making a pileus-like projecting upper edge is said to be *effuso-reflexed*.

IDENTIFICATION OF GILLED MUSHROOMS Features that will allow you to identify gilled mushrooms include the color of the spores in mass on white paper, the presence of a cup or a ring on the stalk, the manner of attachment of the gills to the stalk, the position of the stalk in its attachment to the cap, and the consistency of the stalk. Since a familiarity with these features of gilled mushrooms is necessary before any accurate choices can be made, we provide description of mushroom anatomy.

Spore Color

Fries divided all gilled fungi on the basis of the color of their spores as seen in mass. The color of the gills of the mushroom does not necessarily correspond to the spore color, especially in a young sporocarp, therefore we make a spore print. Although the color of the spores is determined as they appear on white paper, black paper is also used to alert the beginner to the presence of pale colored spores.

TO MAKE A SPORE PRINT

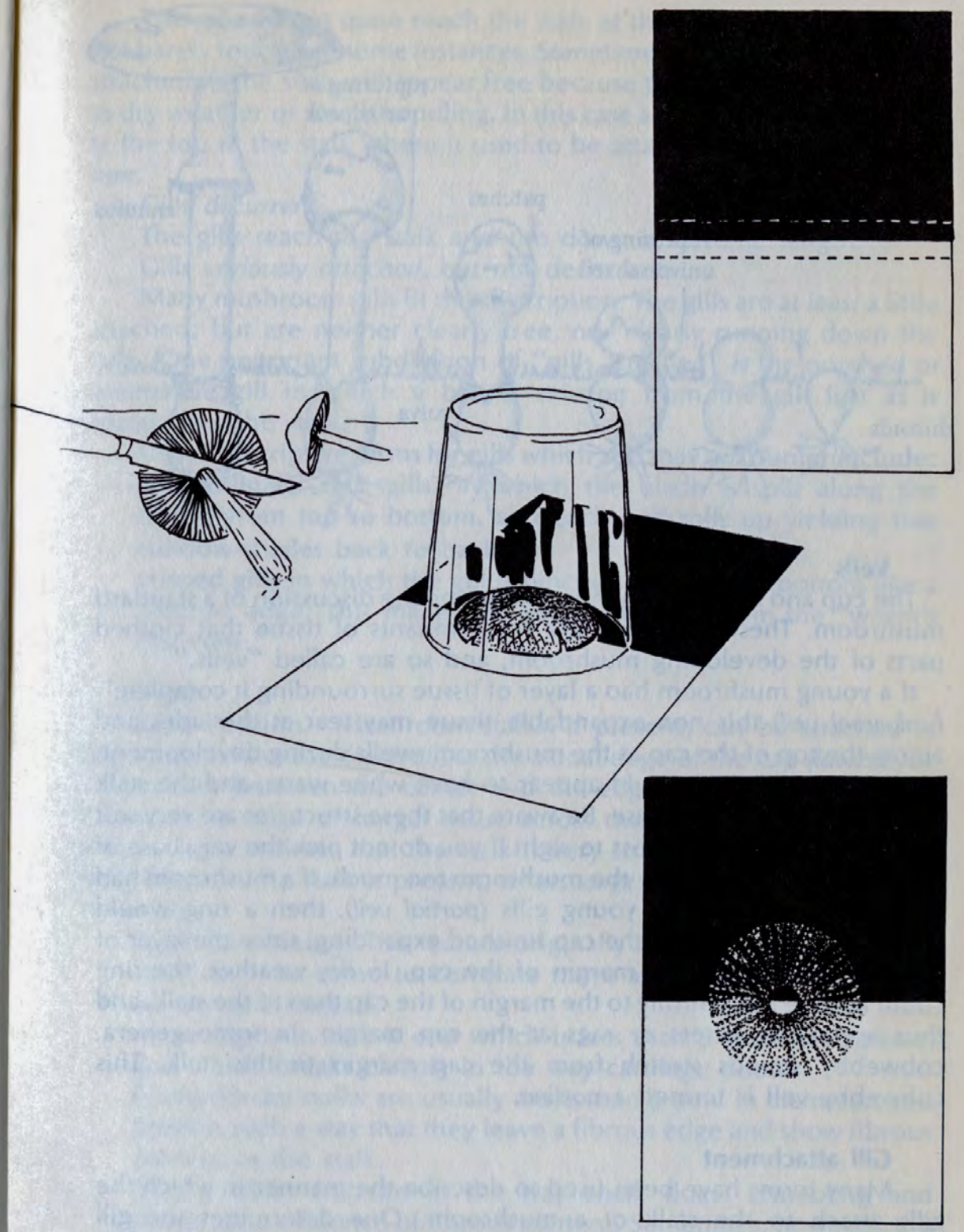
You will need black and white construction paper. Cut a 3 inch by 4 inch piece of each color. Tape the black and white pieces together along the 4 inch side. Cut the mushroom cap from the stipe, level with gills. Place the cap, gills down, on the non-taped side of the black and white papers, straddling the taped joint. Place a glass over the cap. Leave overnight, or at least four hours. The resulting spore print will show light spores on the black paper, or dark spores on the white paper. Fix the print by spraying lightly with clear laquer or acrylic. Label after identifying and file away.

Spore Print Colors

"White" or light spores can be truly white, cream, yellowish, pale lilac or gray, but not light brown.

"Pink" spores are usually a dingy salmon color, like peach-color face powder. They may also be truly pale pink.

"Brown" is a large category, and encompasses all brown tinted spores from yellowish-brown to dark umber. This category does not include

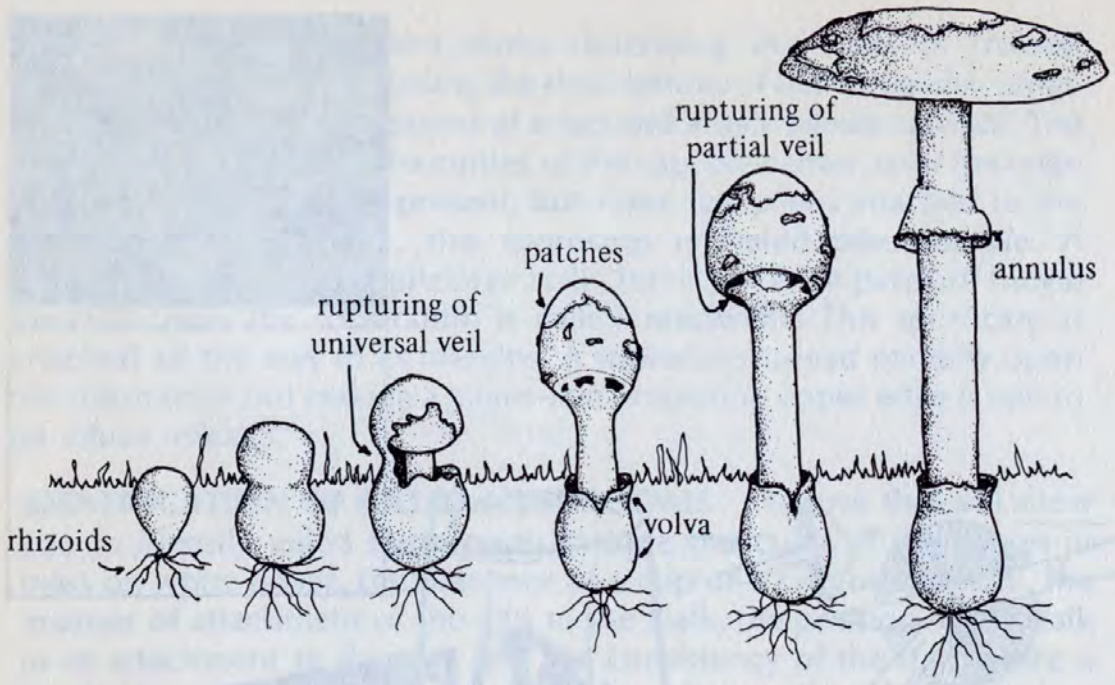


any spores with a purplish cast to the brown.

"Purple-brown" spores are dark brown with a hint of purple.

"Black" spores are honestly black.

Spores can occasionally be olive-green or gray-blue, but only a few fungi exhibit these colors.



Veils

The cup and ring were mentioned during the discussion of a standard mushroom. These structures are the remnants of tissue that clothed parts of the developing mushroom, and so are called "veils."

If a young mushroom had a layer of tissue surrounding it completely *(universal veil)* this non-expandable tissue may tear at the sides and across the top of the cap as the mushroom swells during development. In this case, the cap would appear to have white warts, and the stalk would have a cup at its base. Be aware that these structures are very soft and fragile, and can be lost to sight if you do not pick the very base of the stalk, or if you handle the mushroom too much. If a mushroom had tissue covering just the young gills *(partial veil)*, then a ring would persist on the stalk after the cap finished expanding, since the layer of tissue would tear at the margin of the cap. In dry weather, the ring could adhere more firmly to the margin of the cap than to the stalk, and thus appear as tatters or rags at the cap margin. In some genera, cobwebby strands stretch from the cap margin to the stalk. This cobwebby veil is termed a *cortina.*

Gill attachment

Many terms have been used to describe the manner in which the gills attach to the stalk of a mushroom. One determines the gill attachment by slicing the cap carefully through the cap and stalk vertically, on a diameter. One can then examine the area where the gills just meet the stalk. The categories of gill attachment which we have found to be most meaningful are these:

Gills *free* or nearly so.

The gills do not quite reach the stalk at their inner edges, or they just barely touch it in some instances. Sometimes gills which are actually attached to the stalk will appear free because they have torn away due to dry weather or rough handling. In this case a gill will leave a little line at the top of the stalk where it used to be attached. Such gills are not free.

Gills *decurrent.*

The gills reach the stalk and run down it at some length.

Gills *variously attached,* but not decurrent.

Many mushroom gills fit this description. The gills are *at least* a little attached; but are neither clearly free, nor clearly running down the stalk. One important subdivision of "gills attached" is the notched or *emarginate* gill in which a bite is missing from the gill just as it approaches the stalk.

Other descriptive terms for gills which you may encounter include:

longitudinally split gills, in which the blade is split along the length from top to bottom, and each half rolls up yielding two window-shades back to back;

crisped gills in which the gill is pinched from top to bottom like a piecrust edge. This makes the gills look wavy from the "worm's eye view."

Stipe

Stipe Position. Mushroom stalks, if present, can be attached in the center of the cap *(central)*, at the actual edge of the cap *(lateral)*, or somewhere between the center and the edge of the cap *(eccentric)*. Check for a ridge of fungal tissue across the top of the lateral stalk, which might indicate that the stalk is very strongly eccentric, but not truly lateral. If no stalk is present, whatsoever, the sporocarp is said to be sessile.

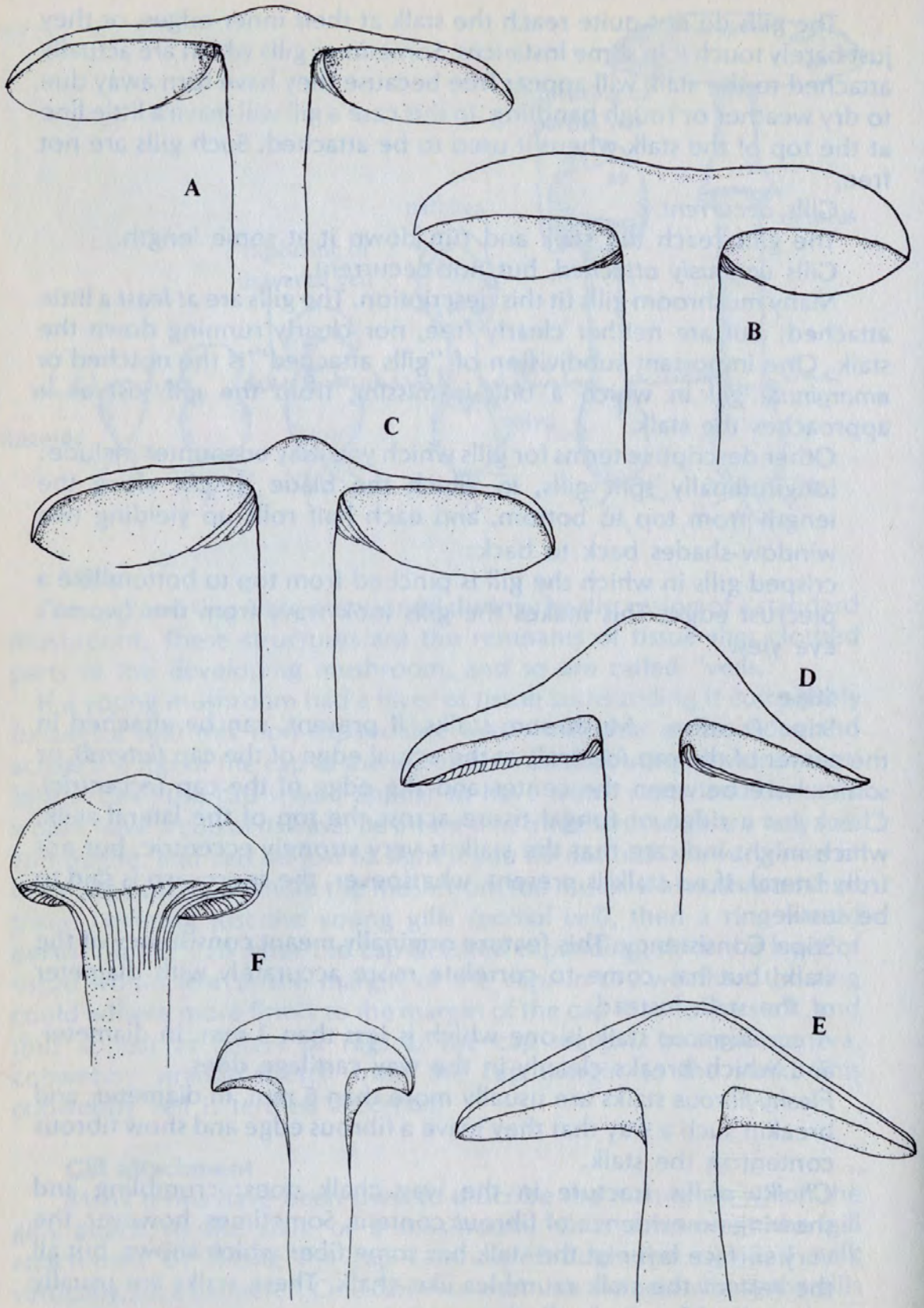
Stipe Consistency. This feature originally meant consistency of the stalk, but has come to correlate more accurately with diameter of the stalk instead.

A *cartilaginous* stalk is one which is less than 3 mm. in diameter, and which breaks cleanly in the way cartilage does.

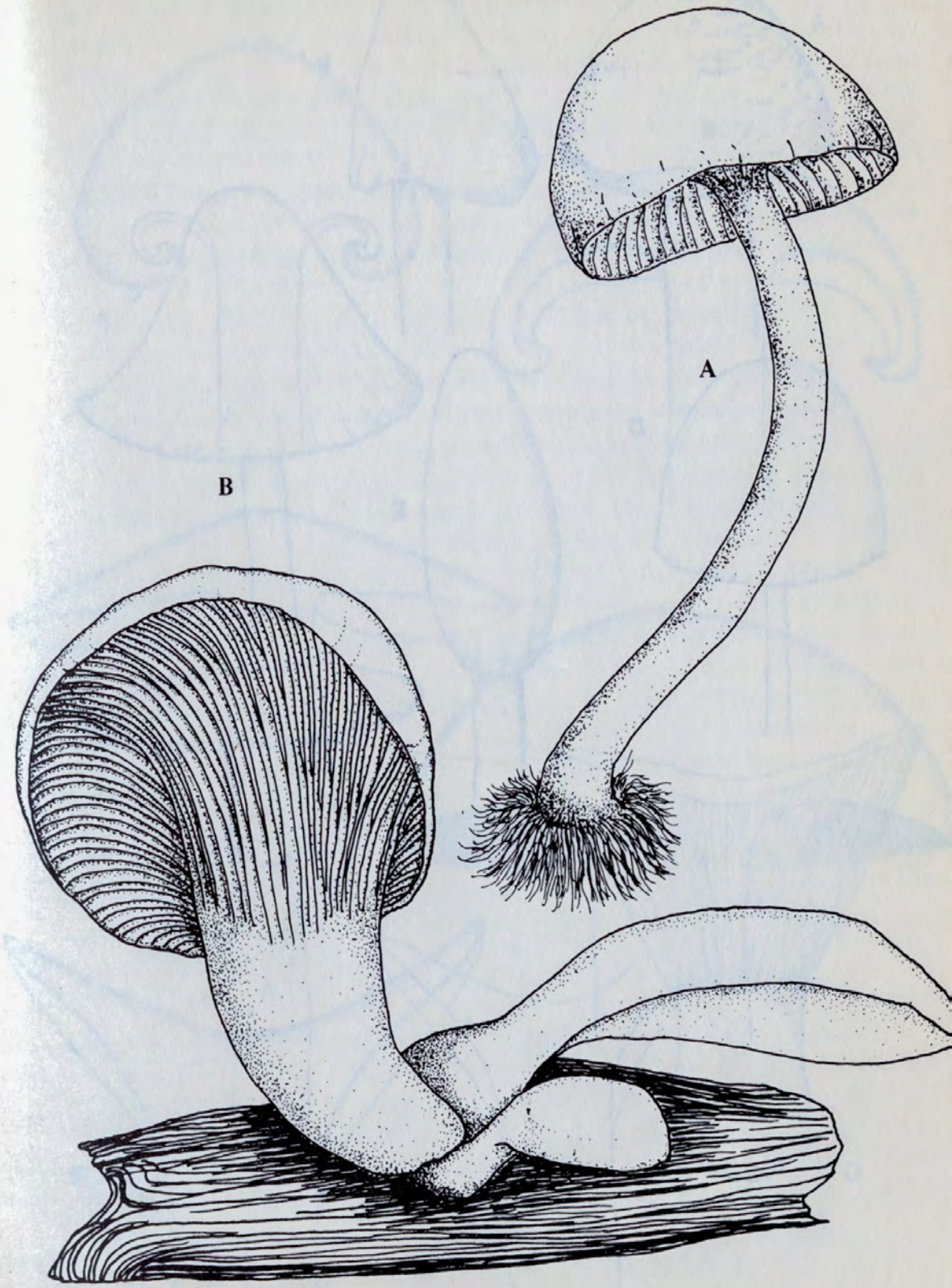
Fleshy-fibrous stalks are usually more than 5 mm. in diameter, and breakin such a way that they leave a fibrous edge and show fibrous content in the stalk.

Chalky stalks fracture in the way chalk does: crumbling and showing no evidence of fibrous content. Sometimes, however, the very surface layer of the stalk has some fiber which shows, but all the rest of the stalk crumbles like chalk. These stalks are usually more than 5 mm. in diameter.

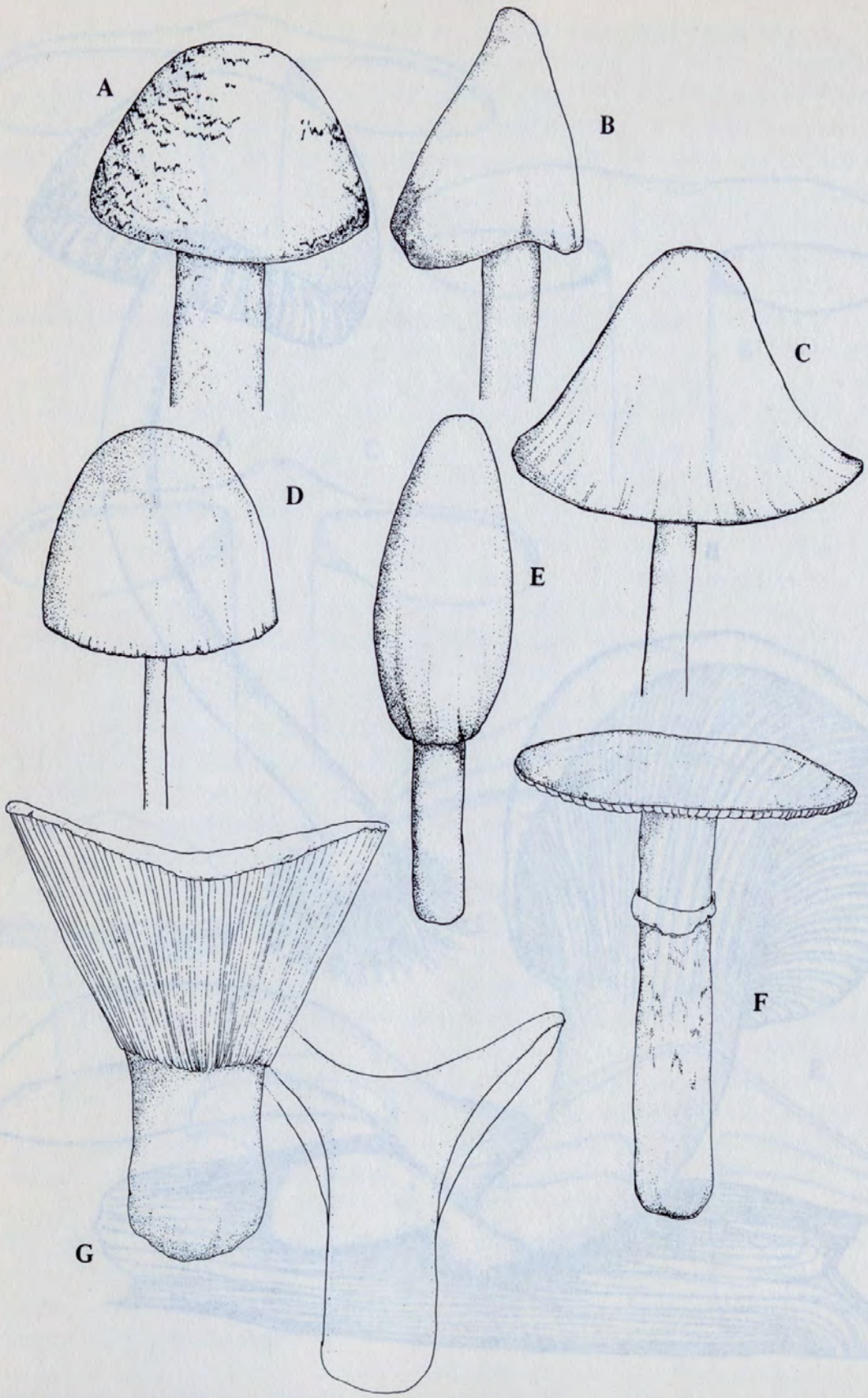
Stipe ornamentation. Stipes can be clothed with hairs, etc. Such features are described under "pileal surface."



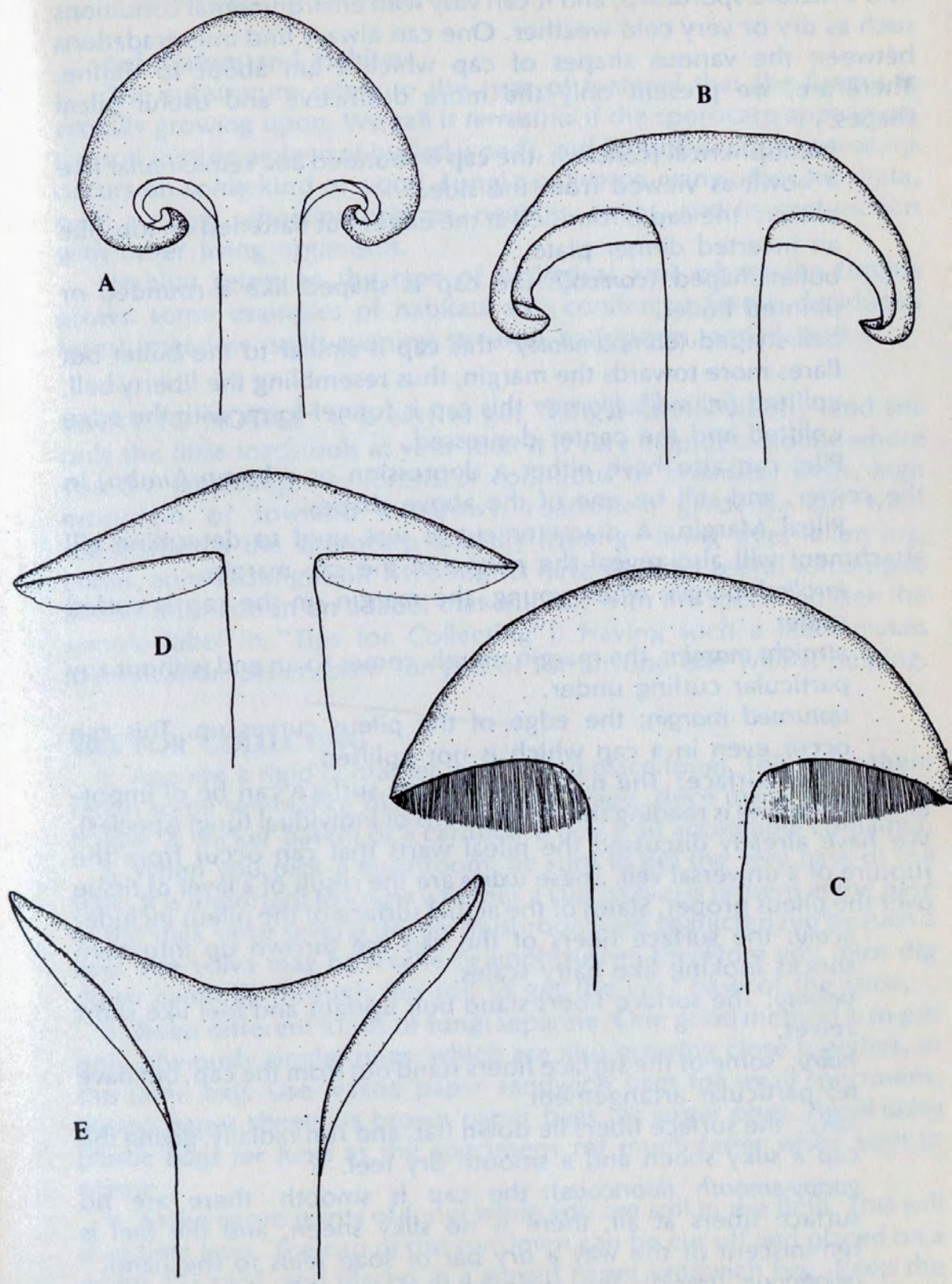
Gill Attachment **A.** free, **B.** emarginate (abruptly adnexed) **C.** adnexed, **D.** sinuate (notched) **E.** subdecurrent **F.** decurrent.



Stipe Attachment **A.** central, **B.** lateral.



Pileal Shape **A.** convex, **B.** conic, **C.** campanulate, **D.** broadly parabolic, **E.** narrowly parabolic, **F.** plane, **G.** uplifted.



Pileal Margins (section view) **A.** inrolled, **B.** incurved, **C.** decurved, **D.** plane, **E.** upturned.

Cap or pileus

Pileal Shape. The shape of a mushroom can change as it develops into a mature sporocarp, and it can vary with environmental conditions such as dry or very cold weather. One can always find intergradations between the various shapes of cap which I am about to define. Therefore, we present only the more distinctive and useful pileal shapes.

hemispherical *(convex)*: the cap is rounded and semicircular like a bowl, as viewed from the side.

planar: the cap is rounded at the edges but flattened on top, like an inverted dinner plate.

bullet-shaped *(conical)*: the cap is shaped like a rounded or pointed bullet.

bell-shaped *(campanulate)*: this cap is similar to the bullet but flares more towards the margin, thus resembling the liberty bell.

uplifted *(infundibuliform)*: this cap is funnel-form, with the edge uplifted and the center depressed.

Pilei can also have either a depression or a bump *(umbo)* in the center, and still be one of the above shapes.

Pileal Margin: A diameter cut as was used to determine gill attachment will also reveal the nature of the cap margin.

inrolled margin: when young, the margin on the cap is curled under

straight margin: the margin merely comes to an end without any particular curling under.

upturned margin: the edge of the pileus curves up. This can occur even in a cap which is not uplifted.

Pileal Surface: The nature of the cap surface can be of importance when one is reading the descriptions of individual fungi (species). We have already discussed the pileal warts that can occur from the rupture of a universal veil. These *warts* are the result of a layer of tissue over the pileus proper. States of the actual surface of the pileus include:

scaly: the surface fibers of the cap are thrown up into corn shocks looking like hairy scales.

velvety: the surface fibers stand bolt upright and feel like short velvet.

hairy: some of the surface fibers stand out from the cap, but have no particular arrangement.

silky: the surface fibers lie down flat, and run radially, giving the cap a silky sheen and a smooth dry feel.

soapy-smooth (lubricous): the cap is smooth, there are no surface fibers at all, there is no silky sheen, and the feel is reminiscent of the way a *dry* bar of soap feels to the hand.

gelatinous (viscid): the surface of the cap has a gelatinized surface layer, ranging anywhere from thick to thin. A thick gelatin layer looks like clear mucus and is sticky. A very thin gelatin layer only feels somewhat tacky when you touch it with a moistened lip or fingertip.

Substratum and Habitat

The substratum refers to the type of material that the fungus is actually growing upon. We call it *terrestrial* if the sporocarp appears on the soil (not on a piece of buried wood), and *lignicolous* if the sporocarp occurs on some kind of wood. Fungi can live on many other substrata, such a dung, other mushrooms, needles, cones, and in conjunction with other living organisms.

Habitat refers to the type of biological area where the fungus grows. some examples of habitats are: coniferous forest, deciduous forest, meadow, swift-running streams, bathrooms, and deserts.

WHAT TO NOTICE It is easy to get "fungal-tunnel-vision," and see only the little toadstools at your feet. It is very helpful to notice where you are collecting, i.e. forests of conferous or broadleaf trees, high mountain or lowland meadows, roadsides, gardens. On what substrarum is the sporocarp actually fruiting—living tree, fallen log, cones, animal dung, soil? Mycologists have found it useful to compile all this information on a label that will stay with the specimen (see the sample label in "Tips for Collecting"). Having such a label makes identification easier, both for you or for anyone else who is helping.

TIPS FOR COLLECTING

1. Acquire a rigid container in which to place fungi. This helps them retain some semblance of their original shape, since many species are fragile. A wicker basket or a cardboard box is an acceptable container.
2. When you pick a mushroom, be sure to get the very base of the stalk. It is important to know whether a cup (volva) is present at the base of the stalk since several deadly mushrooms are characterized by such a cup. The volva may be fragile or unobtrusive, therefore you must dig down carefully through the soil to get the very base of the stipe.
3. Keep different kinds of fungi separate. One good method is to put only obviously similar ones, which are also growing close together, in the same bag. Use waxed paper sandwich bags for small specimens, waxed paper sheets or brown paper bags for larger ones. *Avoid using plastic bags for fungi* as the specimens rot much faster when kept in plastic.
4. Make spore prints of fungi while you are still in the field. This will save time later. The cap of the specimen can be cut off and placed on a white 3X5 card, and placed in a waxed paper sandwich bag. Keep the cap upright, and you may have a good print by the time you reach

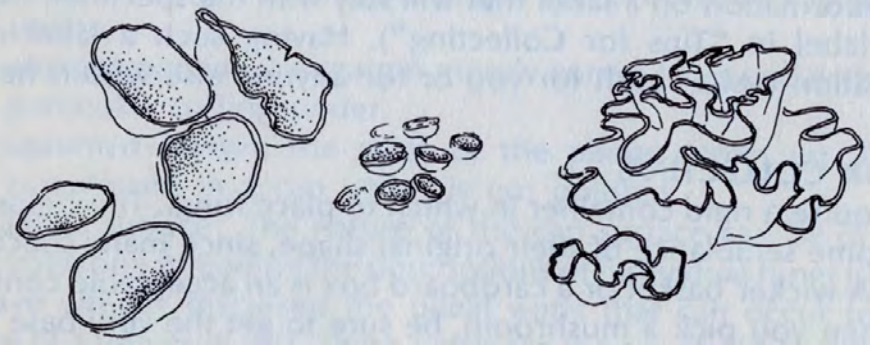
home. Just be sure to keep the appropriate stalk with the cap.

5. Field information can be important. Note such items as: the substratum, nearby vegetation, and the geographical area. Make and use labels for this information, such as shown below.

Specimen # _____ Date _____

Genus & Species _____
Substratum _____
Habitat _____
County & State _____
Identifier _____ Collector _____

6. Keep your specimens cool, preferably in a refrigerator, until you have a chance to identify them. They can be then dried if you wish to keep them. It is more unpleasant and often impossible to identify fungi that have turned to brown slime.



CLASSIFYING FUNGI The large fungi that one notices in the forest are likely to belong to one of two major categories. The Ascomycetes, or cup fungi, contain the fairy cups, morels, brain fungi, truffles, and earth tongues. The Basidiomycetes encompass gilled mushrooms, shelf fungi, puffballs, stinkhorns, jelly fungi, and false truffles. These groups are delimited as follows:

ASCOMYCETES—Spores are produced inside upright sack-like cells *(asci)*. These cells align to form an upright sardine layer that lines a cup of some sort, or a small vase. The modern subdivisions are based on microscopical features, whereas the following categories are based on

sporocarp types for convenience, although the members of a category are not necessarily related.

1. CUP ASCOMYCETES (DISCOMYCETES)

Most of these have sporocarps that are a modification of a cup, and the spores are thus quite free to open air.

A. Fairy cup-these cups occur on wood or on the ground, and may be seated upon a stalk.

B. Brain fungi-essentially, these are everted cups, much convoluted, and with a stalk that can be hollow or riddled with holes.

C. Morels-the caps are modified to look like a sponge, and are continuous with the walls of the stalk.

D. Truffles-these grow underground, and their sporocarp can be visualized thus: a disk-shaped piece of aluminum foil, with spore cells covering one side, is crumpled into a ball and buried. Thus the truffles represent the ultimate modification of the cup or disk-shaped fruiting body. These are much prized in Europe for food, where they are hunted with the assistance of dogs or pigs.

E. Earth Tongues-these are single upright stalks, like matchsticks covered with asci, and growing from the ground in moist places.

2. VASE ASCOMYCESTES (PYRENOMYCETES AND LOCULOASCOMYCETES)

The layer of spore sacks lines a small vase, usually black, imbedded in wood or in a larger knob of fungal tissue. These latter are hard, crusty structures.

Pleurotus ostreatus

BASIDIOMYCETES—spores formed atop club-shaped cells, which may or may not form a layer.

1. HYMENOMYCETES: spores produced from an external layer of a characteristic shape that usually is shielded by some sort of cap.

A. Gilled mushrooms (Agaricales): spore-producing layer in the shape of a series of radiating blade-like gills which are underneath a cap. A stalk may be present or not.

B. Shelf fungi (Polyporaceae): spore-producing layer lining a series of short, parallel tubes coming down from some sort of pileus. The "worm's-eye view" looks like tiny dots or pores on the underside of the fungus. Frequently, the cap is stemless and attached by one edge. Texture is most often tough and woody.

C. Boletes (Boletaceae): the spore producing layer also lines a series of tubes, but these tubes are separable as an entire unit from the cap. All boletes have stalks, and are of soft, fleshy consistency like mushrooms.

D. Spine fungi (Hydnaceae): spore-bearing layer covering a series of downward-directed spines depending from a cap . The sporocarp can be of various shapes and consistency.

E. Chanterelles (Cantharellaceae): the spore layer covers a network of vein-like ridges, the sporocarps are also fleshy-like mushrooms, and stalked.

F. Wrinkle fungi (Meruliaceae): spore-producing layer covering a wrinkled surface. Sporocarps various. The wrinkled surface is a regular or irregular pattern, but is not veined.

G. Unpatterned fungi (Thelephoraceae): spore-producing layer covers a surface which is either smooth or bumpy, but in no recognizable pattern. Sporocarps usually thin and tough, and of various types.

H. Coral fungi (Clavariaceae): The sporocarp is usually a cluster of upright coralloid branches, although there may be only a single stalk. The spore-bearing layer covers the entire surface of the coralloid structure.

J. Jelly fungi (Tremellales): sporocarp with the consistency of gelatin, clear inside. The sporebearing layer covers the outside of the sporocarp.

2. GASTEROMYCETES (PUFFBALLS, STINKHORNS, BIRD'S NEST FUNGI)—spore producing cells are internal until maturity, at which time the sporocarp opens to release spores.

A. Puffballs, earthstars (Lycoperdales): spores are puffed out from an opening in the ball-shaped sporocarp.

B. Earth potatoes (Sclerodermatales): outside of the potato-shaped sporocarp weathers away, thus releasing the spores.

C. Stinkhorns (Phallales): the spores are imbedded in slime which is carried at the top of a stalk or a set of arches.

D. Bird's nest fungi (Nidulariales): the spores are packaged inside egg-like bags which are splashed out of the "nest," a cup-shaped sporocarp.

E. False (Basidiomycete) truffles and the puffball mushroom intermediates (Hymenogastrales).These fungi are grouped together by the fact that at maturity their spore-producing cells remain essentially unchanged. That is, they neither turn to slime like stinkhorns, nor to powder like puffballs and earth potatoes.

The false truffles live completely underground and make a little tuber which never breaks the ground surface unless it is dug up. They are frequently aromatic and some can be eaten. None have yet been tested for dye.

The puffball-mushroom intermediates are a curious group which look like distorted mushrooms but do not shoot off their spores like mushrooms. Instead, they either dry up and break off into pieces in the wind, or the spore-producing area turns to powder. Many of these grow in desert areas.

Agarics

DRAWINGS AND DESCRIPTIONS OF DYE MUSHROOMS

by Dorothy Beebee

Key regarding the dye colors and mordant used.

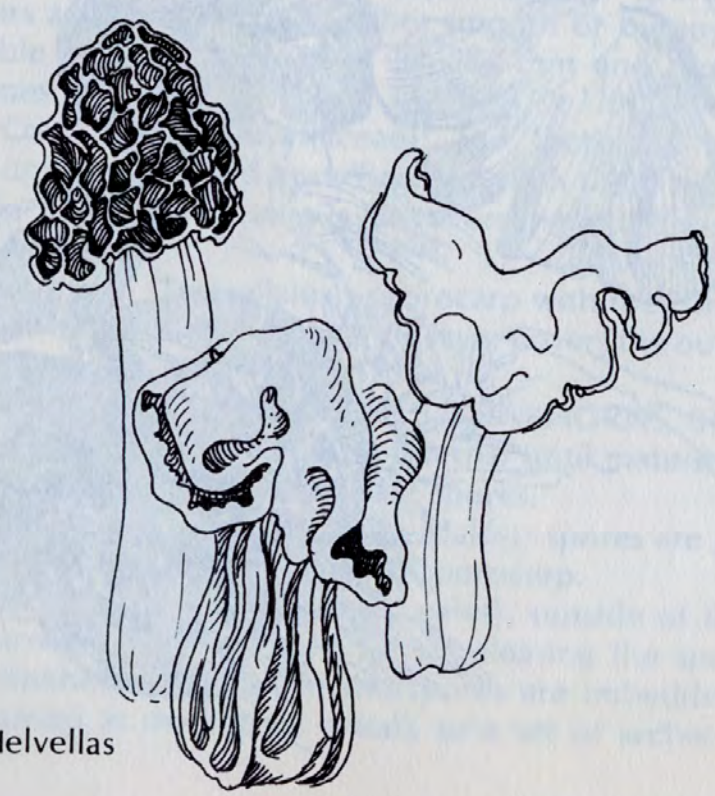
° no mordant (substantive dye)
• alum mordant
• • chrome
• • • tin
• • • • copper
• • • • • iron

This • • • system refers to the knots Miriam devised to differentiate the mordants used on the samples of wool, as she has explained in text under the section on mordants.

Number of reference corresponds to order in our Bibliography.

Ascomycetes

All ascomycetes produce spores within a sack-like cell. These cells are densely packed like blades of grass in a lawn which is growing over the surface of a cup of some sort, or growing within a vase-shaped structure.



Morels and Helvellas

This group is very large and varied, but many of its members are quite small and imbedded in wood so that they go unnoticed. The larger ascomycetes—morels, fairy cups, earth tongues, and truffles—have attracted attention as food, as objects of mystery (ie: Dead Persons Fingers), and now as dye fungi. Most larger ascomycetes are cup-shaped and seated on the ground, or on a stalk. The "cup" may be flattened into a disk, popped inside out to form a cup, convoluted like a brain, or pitted like a sponge. Note that the spores are produced from the surface of the cap rather than from the under-surface as in many Basidiomycetes. The non-cup ascomycetes may be a composite structure where a number of vase-shaped bodies are imbedded in a blob of fungus tissue, forming an upright finger from a dead branch or a knob on a tree.

These fungi need to be investigated for colors. The ones we studied have given brown blacks, brownish to light greens, and apricots.

Gyromitra infula

Cap- 5 to 8 cm. wide, pale to reddish brown, smooth, saddle shaped, convoluted; Stalk- white to pinkish, brittle, hollow, thick broad grooves; Spores- whitish; Habitat- on the ground, often in recently cleared forest areas in Summer and Fall.

Dyes
° beige
• apricot
• • yellow orange
• • • orange
• • • • yellow brown
• • • • • dark brown

References: 24, 25, 36.

Bulgaria inquinans

1-3 cm. across small; rubber-like, blackish, top-shaped (turbinate) fungus growths found growing in clusters on the bark of oak and other hardwoods, frequently on dead or decaying wood; Spores- black.

Dyes — all tests produce brown black

Reference: 17

Daldinia concentrica

2-10 cm. in diameter. Hard, rounded, smooth, with a dull shine; black fungal growths found on hardwood trees and logs. Surface of this carbon-like growth is covered with tiny pores; if growth is cut in two, dark grey-black concentric zones can be seen.

Dyes
- ° grey green
- • grey green
- • • brown green
- • • • sage green
- • • • • brown green
- • • • • • brown green

References: 17, 25.

Daldinia grandis

Specimen collected from Santa Cruz Fungus Fair 1977. I can find no descriptive data in my books on this. It produces dye colors similar to *D. concentrica.*

Dyes
- ° brown green
- • brown green
- • • grey-green
- • • • brown green
- • • • • brown green
- • • • • • brown

Geoglossum viride (Earth tongue)

2-5 cm. tall; this little green "earth tongue" looks exactly like its name implies. It has a tall, flattened club-like cap or head on a scaly olive green stalk; found growing on the soil in deciduous forests, often in small groups or tufts.

Dyes — all tests produce light green

Reference: 16.

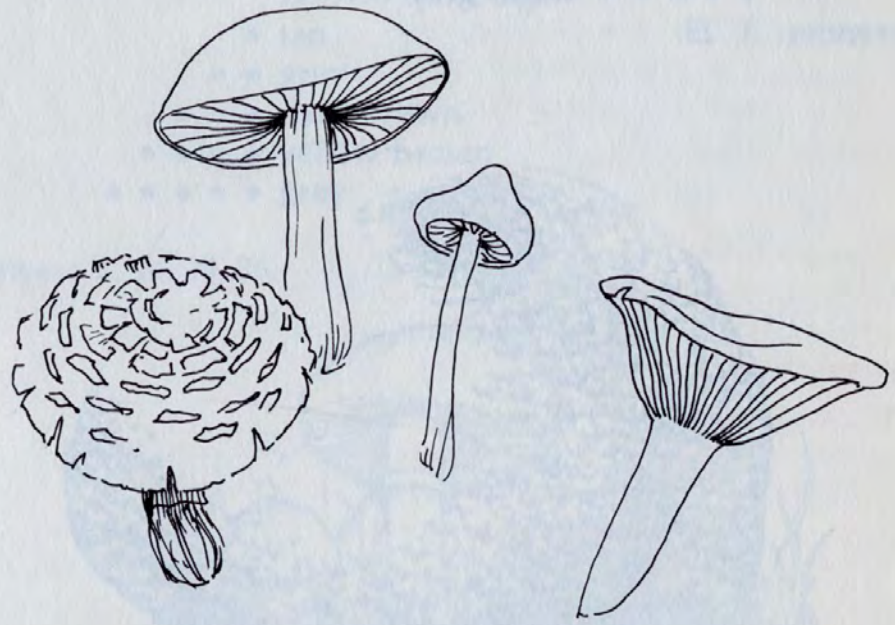
Hypomyces lactifluorum

This is a bright orange parasitic sac fungus appearing as a covering of tiny "pimply" bumps. It grows on and parasitizes large gilled mushrooms most frequently *Russula* or *Lactarius* . The fungus grows over the entire host mushroom. Cap, gills, and stalk, malforming the

development of the host's shape until it appears somewhat funnel shaped, almost hiding the gills, and making it almost impossible to identify the original mushroom. The tiny individual fruiting bodies of the *Hypomyces* parasite can be seen with a hand lens. Spores- white; Habitat- found in both hardwood and conifer forests during Summer and Fall.

Dyes (dried)
- ° apricot
- • apricot
- • • salmon pink
- • • • apricot
- • • • • apricot
- • • • • • apricot

References: 3, 25, 36.



Gilled Mushrooms

Gilled Mushrooms (Agaricales)

These fungi are the traditional mushrooms with cap, stalk, and gills—although sometimes the stalk may be absent. They are usually fleshy, sometimes rather tough or leathery. The common cultivated mushroom of the United States belongs to this group. These are many species distinguished according to the features outlined previously.

Within this extensive group, most all colors are found. With the exception of blue, they are all here, hidden and waiting to be unlocked with each differing mordant—REDS, purples, oranges—brilliant and various, also yellows, and greens.

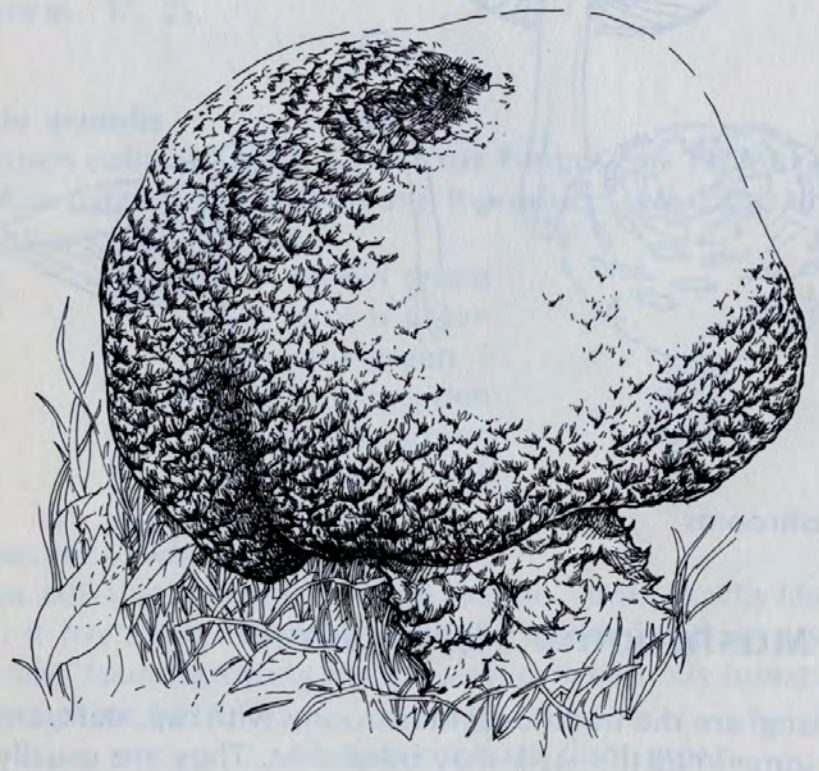
Agaricus arvensis

Cap- 8-15 cm. across; convex, opening to nearly flat in age; smooth; white turning yellowish in age with small scales toward center of cap; bruises yellow; flesh is white at first slowly turning yellowish in age; anise-like odor. Gills- whitish at first, turning greyish-pink, then dark brown in age; free and crowded. Stalk- up to 15 or 20 cm. long, smooth, dry and shiny above white, skirt-shaped ring (pendant annulus), and with small cottony scales below; Spores- purplish-brown; Habitat-often found on lawns, meadows, fields, other grassy areas in Summer and Fall.

Dyes

- ° beige
- • beige
- • • tan
- • • • golden brown
- • • • • tan
- • • • • • warm grey

References: 3, 25.



Agaricus augustus

Cap- huge - up to 35 cm. across; convex with a flattened top at first, then flattening out with age. Buff to yellowish brown dry cap with a dense covering of dark reddish-brown flattened scales (appressed fibrillose), flesh white bruising yellowish, odor of anise or almond. Gills- creamy white when very young, turning pink and then chocolate

brown, free, crowded or close; Stalk- thick, 8-20 cm. long, white and smooth above a double ring (annulus) with cottony patchy scales (floccose) below; Spores- purplish-brown or chocolate brown; Habitat-grassy areas or near conifers from Summer through Fall.

Dyes

Dried (whole)

- ° ---(no color)
- • beige
- • • tan
- • • • yellow brown
- • • • • tan
- • • • • • grey

Gills (fresh)

- ° pinkish tan/beige
- • tan
- • • grey
- • • • dark brown
- • • • • yellow brown
- • • • • • grey

References: 3, 24, 25, 36.

Agaricus campestris

Cap- 2-5 cm. across, white, sometimes fibrillose on top, flesh does not bruise; Gills- crowded, free from stalk, pink at first, turning dark brown with spores in maturity; Stalk- white, smooth with a white, thin, single

ring, can be shorter than illustrated; Spores- dark purple brown; Habitat- found in grassy areas, meadows in Fall and Spring; commonly known as "Meadow Mushroom."

Dyes
° tan
• beige
• • tan
• • • yellow brown
• • • • tan
• • • • • warm grey

References: 3, 19, 24, 25, 26.

Agaricus bisporus

At one time the commercially grown mushroom was generally known as *Agaricus campestris* since all of the external "in the field" characteristics seem identical, the only real differentiation of the two can be observed under a microscope (*A. bisporus* has 2 spored basidia and *A. campestris* has 4 spored basidia). Now, however, it has been given a name all of its own, *Agaricus bisporus*, and it is generally recognized as the commercially grown "species" of *A. campestris*. Note that there is a definite, consistent difference between the dyes the two species produce.

Dyes — all tests produce tan

References: 3, 36.

Agaricus crocodilinus

Cap- large, 10-35 cm. broad, squat; broadly convex, dry, whitish with brown appressed fibrils, becomes cracked in age, fibrils appearing grouped in such a manner to look like overlapping scales, bruising yellow. Gills- "light russet vinaceous" in early stages to dull chocolate brown in maturity; Stalk- thick and short compared to width of cap, white, flesh does not change color where bruised; double ring, lower ring often appearing as cottony patches on lower part of stalk; Spores- dark chocolately brown; Habitat- often seen in pastures along the Pacific Coast in Spring.

Dyes
° beige
• beige
• • beige
• • • golden brown
• • • • (greenish) tan
• • • • • beige

References: 29, 34.

Agaricus pattersonae

Cap- large, 7-20 cm. across, buff with darker brown flattened scales or (appressed) fibrils, margin had definite inrolled appearance; Flesh- white (doesn't stain where bruised); Gills- free, pink in young specimens, turning chocolate brown with spores in maturity; Spores- dark brown; Stalk- smooth, short and thick, no bulb at base, silky white above ring, cottony patches below are part of double ring; Habitat- this specimen found under Douglas fir trees in Fall, with lots of good goat manure.

Dyes
° beige
• beige
• • tan
• • • brown
• • • • tan
• • • • • brown

References: 34, 36.

Agaricus sylvaticus

Cap- 4-12 cm. broad, whitish with reddish-brown threads (fibrils), flesh white, cap slowly bruises red; Gills- free, whitish, then pink to grayish-pink when young; brownish vinaceous in age; no odor of phenol; Spores- chocolate brown; Stalk- smooth above and below double ring, underside of ring has soft patches of grayish vinaceous fibrils which are white when young, usually with bulb at base; Habitat- found Fall and Spring in mixed conifer and hardwood forests.

Dyes
- ∘ tan
- • tan
- • • brown
- • • • dark brown
- • • • • brown
- • • • • • tan

References: 3, 24, 25, 34, 35.

Agaricus subrufescens

Cap- up to 15-20 cm. broad, buff to pale tawny yellow cap with brownish fibrils; Gills- white in young stage changing to dark chocolate brown with spores; Stalk- cottony patches underneath ring; Spores- chocolate brown; Habitat- frequently seen under conifers.

Dyes
- ∘ beige
- • beige
- • • warm grey
- • • • tan
- • • • • tan
- • • • • • warm grey

Reference: 36.

Collybia acervata

Cap- convex in shape, dark reddish (vinaceous) brown which fades to light buff brown in age, margin is slightly incurved; Gills- light buff with a vinaceous tinge. Stalk- same dark brown as a young cap, long. Spore print- white. Habitat- found during Fall rainy reason growing in dense clusters on old decayed conifer logs and stumps.

Dyes
- ∘ pink
- • tan
- • • greenish tan
- • • • brown green
- • • • • grey green
- • • • • • beige

References: 3, 19, 34

Cortinarius phoeniceus var. ***occidentalis***

Cap- 3 to 7 cm. wide, dark reddish maroon, "silky" appearance, whiny when dry, definite knob (umbo) on top of cap, remnants of veil (cortina) often visible along margin of cap; Gills- brilliant red (almost iridescent) when young, turning brownish with formation of spores; Stalk- ochreous-yellow or straw yellow, somewhat fibrillose; Spores- cinnamon; Habitat- found growing singly, or in clusters (see illustration) in mixed conifer forests in Fall to early Spring through

Pacific North West and elsewhere. This specimen was found growing in habitat of manzanita, salal and huckleberry near Mendocino, CA.

Dyes

Fresh

- ° apricot
- • wine red
- • • burgundy
- • • • blood red
- • • • • greyed burgundy
- • • • • • blue purple

Dried

- ° apricot
- • rose
- • • burgundy
- • • • red
- • • • • greyed purple
- • • • • • blue black (and also dark blue-purple)

References: 3, 24.

Cortinarius semisanguineus

Cap- 5- 7 cm. broad in maturity, slight umbo, tawny to cinnamon yellow, dry, smooth, remains of veil (cortina) evident when young, flesh is yellowish white; Gills- blood red when young, becoming "rusty" with age due to spore formation; gills attached to stalk; Stalk- yellowish-tawny, fibrillose; Spores- rusty-brown; Habitat- single or small groups scattered throughout conifer woods in Summer and Fall throughout Pacific Northwest.

Dyes (dried)

- ° apricot
- • apricot
- • • cinnamon
- • • • salmon pink
- • • • • tan
- • • • • • tan

References: 3, 25.

Cortinarius cinnamomeus gp.

Cap- 2 to 5 cm. broad, with umbo, becoming almost flat with maturity, yellow brown to cinnamon brown, remnants of cortina evident on edge of cap, flesh is pale yellow; Gills- yellowish, turning brown with spores in maturity; Stalk- yellow to yellowish-cinnamon, often with fine hairs; Spores- brown; Habitat- under conifers, Fall and Summer.

Dyes

Fresh

- ° orange
- • orange
- • • cinnamon
- • • • orange
- • • • • cinnamon
- • • • • • orange

Dried

- ° orange
- • orange
- • • burnt orange
- • • • orange
- • • • • burnt orange
- • • • • • mustard

References: 3, 17, 24, 25.

Cortinarius sanguineus

Cap- 2-5 cm. broad, dark blood red, bell-shaped, "silky," dry, fibrillose, remains of veil (cortina) on edge of cap in young specimens, flesh is also blood red; Gills- blood red, close, attached to stalk (adnate); Stalk- blood red; Spores- rusty brown; Habitat- on ground under conifers during Fall.

Dyes (dried)
- ∘ tan (a fresh but old, frozen sp. produced purple in Sweden!)
- • red orange
- • • rose
- • • • orange red
- • • • • cinnamon
- • • • • • tan

References: 3, 24.

Cortinarius annulatus

Note- Specimen sent for experiment by Dr. Alexander Smith; he collected it in Michigan in 1940. No descriptive data could be found in my books.

Dyes (dried)
- ∘ yellow
- • yellow
- • • gold
- • • • gold
- • • • • green yellow
- • • • • • gold

Cortinarius aureifolius

Cap- dark reddish, cinnamon brown, appressed fibrillose in maturity, convex in shape at first then opening to nearly plane in maturity or

slightly depressed in center, flesh yellow; Gills- yellow at first, changing to brownish orange in maturity, gills notched where they join the stalk (adnexed); Stalk- short, yellow, covered with flattened fibrils or hairs (fibrillose), up to 4 cm. tall; Spores- light orange-yellow; Habitat- in sand, within the vicinity of lodgepole pine; it forms a mycorrhizal relationship with the rootlets of pine.

Dyes (semi-dried)
- ∘ salmon pink
- • salmon pink
- • • dusty rose
- • • • light cinnamon
- • • • • burgundy
- • • • • • cinnamon

References: 2, 36.

Cortinarius californicus

Cap- rusty red in color, changes to a darker color when wet or moist (hygrophanous); veil (cortina) in young specimens. Gills- bright red; Stalk- pale orange (or ferrugineous) stalk with reddish-orange mycelium at base; Spore print- rusty brown; Habitat- found in the Pacific Northwest under spruce and fir. Note- though this species may resemble species in the Dermocybe group by its color, it is definitely separated from them by its hygrophanous characteristic.

Dyes (dried)
- ∘ apricot
- • salmon pink
- • • mauve
- • • • apricot
- • • • • mauve
- • • • • • apricot

Reference: 36.

Cortinarius cotoneus

Cap- 3 to 8 cm. broad, yellow-olive covered with blackish-brown fibrils, flesh greenish yellow to brown (when wet); Gills- yellowish brown when young, darkening with formation of spores; Stalk- up to 15 cm. long, olive-yellow above, brownish yellow below fragment of yellowish veil remaining on stalk; Spores- cinnamon brown; Habitat- found on ground in conifer woods in Fall, Winter.

Dyes

Fresh
- ∘ light green
- • light green
- • • yellow green
- • • • olive green
- • • • • mustard
- • • • • • olive green

Dried
° beige
• beige
• • light olive green
• • • beige
• • • • beige
• • • • • beige

References: Stuntz- 1965 (unpublished ms.)

Cortinarius croceofolius

Cap- 3-5 cm. broad, tawny cinnamon brown, smooth, almost silky, covered with dense hairs (fibrillose), sometimes yellowish-orange along the margin, flesh pale yellow; Gills- very bright saffron-orange when young becoming darker with spores in maturity; Stalk- up to 5 cm. long, yellow to yellow orange, fibrillose; Spores- rusty brown; Habitat- on ground in conifer woods, Fall; Note- very similar to and easily confused with *C. cinnamomeus* possibly integrating with it.

Dyes (dried-powdered)
° red
• wine red
• • burgundy
• • • red
• • • • ---(no sample recorded)
• • • • • purple black

References: 24, and Stuntz, unpublished ms., 1965.

Cortinarius croceus

Cap- olivaceous brown, expanded in maturity, with definite umbo; Gills- orange yellow (saffron); Stalk- yellowish; Spores- rusty brown; Habitat- on the ground under conifers; Note- sample of wool dyed with specimen sent to us by Carla Sundstrom in Sanviken, Sweden where it is collected in Summer and Fall.

Dyes
° yellow
• yellow

Reference: 32.

Cortinarius violaceous

Cap- 2 to 13 cm. broad, dark purple-violet, with an almost metallic sheen, dry, covered by tiny erect hairs or fibrils, convex shape at first expanding to almost flat in maturity; flesh also dark purple, veil (cortina) in young specimens; Gills- same color as cap, attached to cap, distant, darkening with formation of rusty spores in maturity; Stalk- same color as cap and gills, up to 13 cm. long, covered with minute hairs (densely fibrillose); Spores- rusty-cinnamon brown; Habitat- found in Pacific Northwest during Fall on ground under conifers, particularly Douglas Fir.

Dyes (fresh)
° light grey
• warm grey
• • tan
• • • tan
• • • • grey-brown
• • • • • warm grey

References: 3, 24, and Stuntz, unpublished ms., 1965.

Chroogomphus (Gomphidius) rutilus

Cap- 2-10 cm. broad, olivaceous-ochraceous at first to a reddish brown in older specimens, convex in shape with definite knob, viscid, incurved on margin when young, flesh buff-salmon-orangish, dry, hairy veil in young specimens; Gills- buff to yellowish-cinnamon brown; thick, extending down stalk, well separated; Stalk- long, 4 to 18 cm. (always longer than cap is broad), buffish to orange-buff, turning vinaceous with age, tapered at base, dry to moist, slight veil of dry hairs (from veil) which disappears with age; Spores- dark grey to black; Habitat- found alone to abundant under conifers, especially pines.

Dyes
° beige
• beige
• • tan
• • • burnt orange
• • • • grey green
• • • • • tan

References: 24, 25, 36.

Chroogomphus (Gomphidius) vinicolor

Cap- 2-5 cm. wide, ochreous when young, turning more vinaceous or dark red brown as it matures, cap has pointed knob and viscid surface on almost a conic shape; Gills- same color as cap, extending slightly down stalk; Stalk- vinaceous to yellowish ochre; Spores- black; Habitat- found singly or in groups under conifers Fall through Spring; Note- very similar in appearance to *Chroogomphus rutilus* when seen out in the woods, except it is smaller, more ochreous when young and more reddish in maturity than *C. rutilus*.

Dyes
- ◦ pink
- • dusty rose
- • • red brown
- • • • cinnamon (pink when fresh frozen!)
- • • • • dark brown
- • • • • • grey brown

References: 25, 26, 34.

Gomphidius glutinosus

Gomphidius glutinosus

Cap- 2-10 cm. wide, purplish brown to greyish brown with a violet tinge, but no pink or rose coloration, viscid appearance due to a thick glutinous layer (cuticle) on surface of cap; cap sometimes spots or stains blackish either with age or if bruised. Gills- light greyish white, turning darker smokey grey from spores, extending down stem, close; Stalk-

whitish above remnant of slime veil (ring which turns darker with spores), yellow below ring, viscid to glutinous in appearance, tapering toward base; Spores- black; Habitat- found in groups in coniferous forest rich in humus, found June through December in California.

Dyes
- ◦ tan
- • brown
- • • brown
- • • • brown
- • • • • dark brown
- • • • • • grey brown

References

Gomphidius subroseus

Cap- 3-6 cm. broad, rounded (convex) at first then turning flat with age with an upturned margin, pinkish to rosy red cap with a glutinous layer (cuticle) which gives cap a slimy appearance when wet, flesh white and a clear, slime veil on young mushrooms which leaves a glutinous ring on a stalk; Gills- white, turning to smoky grey with age, extending down stem (decurrent), thick, waxy, widely spaces (subdistant); Stalk- white above ring, yellowish below, becoming bright yellow at base of stalk, glutinous ring soon becomes dark with spores, stipe often has glutinous appearance; Spores- black; Habitat- found growing singly, often in great abundance in Fall and Spring under conifers, especially Douglas Fir.

Dyes
- ◦ beige
- • beige
- • • beige
- • • • brown
- • • • • tan
- • • • • • beige

References: 24, 25, 36.

Gymnopilis junonius *(= Pholiota spectabilis)*

Cap- large, 5 to 20 cm. across, yellow-orange to ochre, smooth and hairless when young, but covered with fine smooth hair in maturity, veil yellowish, convex shape when young turning almost flat with age, flesh pale yellow; Gills- yellow-orange, crowded, attached to stalk to slightly descending stalk; Stalk- long, up to 20 cm. yellow-orange, slight membranous veil; Spores- rusty-orange; Habitat- this cluster was found at base of Douglas fir stump in mixed conifer woods of Mendocino County in December (Stuntz Foray) 1978.

Dyes

Dried
- ◦ pale lemon yellow

• pale lemon yellow
• • pale lemon yellow
• • • mustard
• • • • pale lemon yellow
• • • • • pale lemon yellow

Fresh
◦ bright lemon yellow
• yellow
• • mustard
• • • gold
• • • • yellow brown
• • • • • mustard

References: 19, 25.

Gymnopilus penetrans *(= Flammula penetrans)*

Cap- smaller than *G. junonius*, up to 6 or 8 cm. wide, convex, yellow-orange, hairless surface (dry or viscid) white veil, slightly umbonate, yellowish flesh; Gills- yellow, becoming rusty-brownish with spores; Stalk- no ring even though there is a veil when young; Spore print- rusty brown; Habitat- growing singly or in groups (caespitose) on wood, or on the ground under which is buried or rotting wood.

Dyes
◦ gold
• gold
• • mustard
• • • yellow orange
• • • • cinnamon
• • • • • greenish yellow

References: 17, 25.

Pholiota kauffmanii

Cap- 5 to 10 cm. across, brilliant bright yellow color, covered with fine scales, somewhat sticky, remnants of veil (cortina) evident in young specimens; Gills- same color as cap, turning brownish with spores; Stalk- same bright yellow, a little darker toward base; covered by scales from base up to ring left from veil; Spore print- brown; Habitat- growing either alone or in clusters on rotting logs or buried wood of conifers.

Dyes

Fresh
◦ lemon yellow
• bright lemon yellow
• • mustard
• • • orange
• • • • mustard
• • • • • greenish yellow

Dried
◦ lemon yellow
• lemon yellow
• • lemon yellow
• • • yellow
• • • • greenish yellow
• • • • • lemon yellow

References: 19, 34.

Hygrophorus citrinus

Cap- 1-2 cm., lemon yellow, somewhat viscid, flat, slightly rounded at margin, sometimes slightly depressed in center, margin has radiating lines along the edge (striate), color faces quickly with age; Gills- lemon yellow, slightly decurrent; Stalk- lemon yellow, somewhat viscid; Spores- white; Habitat- found in grassy areas, or open woodlands in Fall.

Dyes all tests produce pale lemon yellow

References: 17.

Hygrophorus conicus

Hygrophorus conicus

Cap- 2 to 8 cm. broad, sharply conic in shape, with wavy margin, red to red-orange in color, sometimes tinged with olive, cap turns blackish when bruised, somewhat viscid or gelatinous surface; Gills- almost free, yellowish white; waxy in appearance, bruising blackish; Stalk- up to 10 cm. tall, reddish orange, moist, but not viscid, twisted in appearance, hollow when mature, bruising black; Spores- white; Habitat- singly or in groups under conifer and hardwood, year around. This specimen was

found in early Spring, under redwood in Mendocino County near Philo; drawing made in its habitat.

Dyes

Fresh

° beige
• beige
• • tan
• • • mustard
• • • • brown green
• • • • • beige

Aged 3 months

° greenish tan
• tan
• • greenish tan
• • • olive green
• • • • greenish tan
• • • • • green grey

References: 3, 24, 25.

Hygrophorus hypothejus

Cap- 2-5 cm. across, slimy or glutinous, olivaceous brown, flat with depression in center, minute fibrils radiating out from darker center of cap; Gills- yellow becoming saffron later in age, extending down stem slightly (decurrent); Stalk- has a definite unslimy zone at apex (of stalk) which is lighter color than cap; rest of stalk is slimy coated; Spore print- white; Habitat- commonly found under conifers in fall months, particularly under larch in the West.

Dyes

° cinnamon
• red brown
• • red brown
• • • ---(no record)
• • • • dark brown
• • • • • brown

References: 3, 36.

Hygrophorus miniatus

Cap- 2 to 4 cm. wide; small, almost translucent, scarlet, turning orange to yellow as it dries or with age, cap becomes depressed in center (Fig. B) and becomes uplifted with age; Gills- same color as cap, waxy, either attached to stem or notched near stem; Stalk- same color as cap, 3 to 5 cm. tall in maturity; Spores- white; Habitat- on moist ground or in moss, or on very decayed wood in conifer woods.

Dyes

° lemon yellow

• lemon yellow
• • greenish yellow
• • • ---(no record)
• • • • greenish yellow
• • • • • lemon yellow

References: 24, 25.

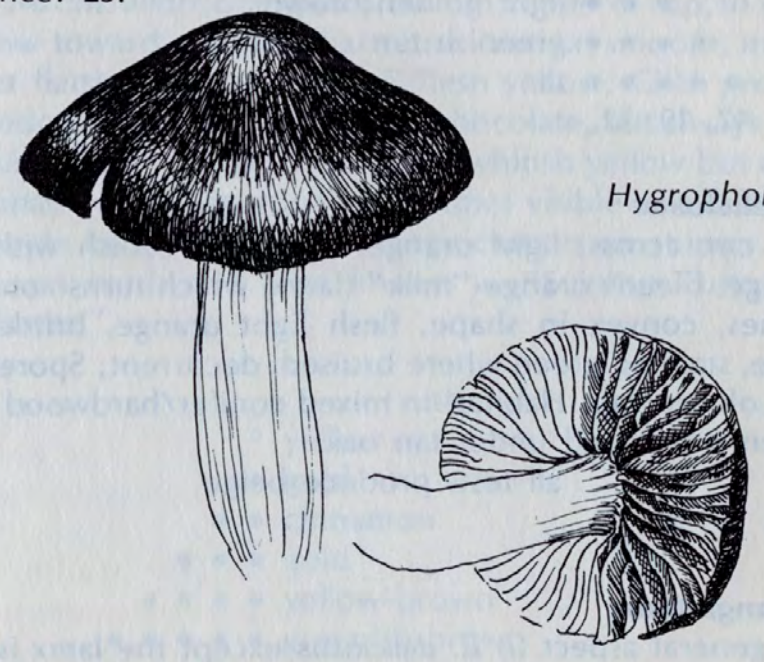
Hygrophorus psittacinus

Cap- 1-3 cm. broad, green, viscid to glutinous, changing in shape from conic to convex in age, color variations toward yellowish or pinkish, flesh light greenish; Gills- light green to yellowish green, attached (adnate), widely separated (distant); Stalk- up to 8 cm. long, quite viscid to actually slimy, varying from green at apex to yellow below; Spore print- white; Habitat- found on grassy soils or under conifers and hardwoods from Spring through Summer and Fall. Note- Sometimes called the "Parrot Mushroom" because of its unique greenish colors.

Dyes

° ---
• ---
• • greenish yellow
• • • mustard
• • • • ---
• • • • • ---

Reference: 25.



Hygrophorus puniceus

Hygrophorus puniceus

Cap- 3-4 cm. across, viscid, deep blood red, turning lighter with age; often wavy around lower edge, striate margin; Gills- orangish yellow, distant, slightly adnexed, "waxy" appearance; Stalk- orangish yellow,

fibrous appearance, hollow, whitish at base; Spores- white; Habitat- mixed conifer redwood; also in grassy places, fields, roadside, found June to December, gregarious to scattered under hardwoods, conifers.

Dyes
- ◦ ---(no color)
- • ---(no color)
- • • greenish yellow
- • • • lemon yellow
- • • • • greenish yellow
- • • • • • pale lemon yellow

Reference: 25.

Inocybe maculata

Cap- 3-6 cm. across in maturity, brown with dark brown fibrils (fibrillose), cap is somewhat conical at first, opening up to flat in maturity and with splits along the margin (rimose) which became more noticeable when cap is opened flat, flesh white; Gills- light greyish at first, becoming medium brown with the formation of spores, almost free from stalk, edges of gill blades lighter than rest of gills; Stalk- long, lighter at apex, rest of stalk same brownish color as cap; Spore print- brown; Habitat- single to gregarious in grassy areas or open woods.

Dyes
- ◦ beige
- • beige
- • • dark tan
- • • • light golden brown
- • • • • greenish tan
- • • • • • tan

References: 17, 19, 32.

Lactarius deliciosus

Cap- 6-12 cm. across, light orange, turning greenish with either bruising or age, bleeds orange "milk" (latex) which turns zoned with greenish tones, convex in shape, flesh light orange, brittle; Gills- bright orange, staining green where bruised, decurrent; Spores- buff; Stalk- same color as cap; Habitat- in mixed conifer/hardwood forests. This specimen was found under tan oak.

Dyes — all tests produce beige

References: 25, 36.

Lactarius sanguifluus

Similar in general aspect to *L. deliciosus* except the latex is a dark blood-red at first, and the gills are a dark purplish-red. *L. sanguifluus* also bruises green where cut or injured.

Dyes
- ◦ beige
- • beige

- • • beige
- • • • tan
- • • • • tan
- • • • • • beige

References: 25, 36.

Naematoloma capnoides

Cap- 2-5 cm. wide, orangish-ochre yellow, smooth, flesh light yellow to whitish; Gills- whitish at first, turning greyish-lilac to chocolate in maturity, with no hint of chartreuse, gills attached (adnate) to stem; Stalk- yellowish, with faint ring; Spores- purple brown; Habitat- grows in clusters on conifer stumps, especially pine and fir throughout the year, also known as "Smoky Gilled Wood Lover."

Dyes (fresh)
- ◦ lemon yellow
- • yellowish beige
- • • tan
- • • • yellow orange
- • • • • golden brown
- • • • • • greenish brown

References: 25, 34, 36.

Naematoloma fasciculare

Cap- 2-8 cm. wide, orangish brown in center of cap, to smoky greenish yellow toward margin, chartreuse cortina, smooth, moist, conic at first, but flattening out with age, flesh yellow; Gills- greenish-yellow when young, then olive green then chocolate, but always with a hint of chartreuse; Stalk- up to 12 cm. long, whitish yellow but darker below the remnant of veil (cortina) sometimes visible as a faint ring; Spore print-purple brown; Habitat- in large clusters on stumps, logs of both conifer and hardwood, also known as "Sulphur Tufts," "Clustered Wood Lover."

Dyes

Fresh
- ◦ yellow
- • gold
- • • cinnamon
- • • • gold
- • • • • yellow-brown
- • • • • • greenish-brown

Dry
- ◦ yellow
- • ---
- • • mustard

• • • burnt orange
• • • • golden brown
• • • • • greenish brown

References: 25, 34, 36.

Omphalotus olivascens

Cap- 2-7 cm. across, dusky, vinaceous with olive overtones, cap slightly to deeply depressed in center; Gills- olive gold, running down stalk (decurrent), phosphorescent, close, with lamellae along margin of cap; Stalk- olive-gold, brighter at base, growing in clusters, joined at base (caespitose) as shown; Spores- pale cream; Habitat- found at base of stumps or possibly from buried roots of hardwoods in late Fall.

Dyes

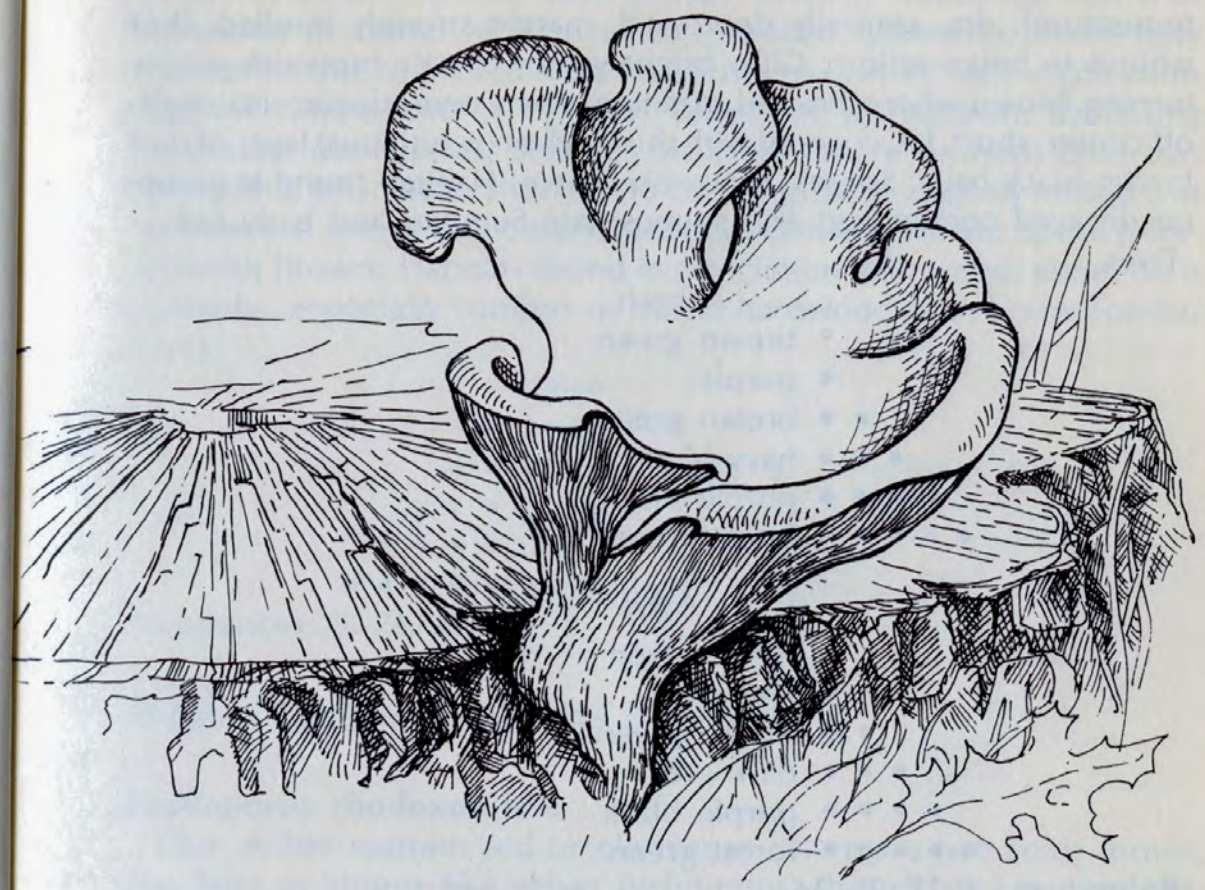
Fresh

° grey
• lavendar
• • forest green
• • • blue green
• • • • blue black
• • • • • green

Dry

° grey
• blue purple
• • forest green
• • • tan
• • • • black
• • • • • forest green

References: 36,



Panus torulosus

Cap- 2-10 cm. broad at maturity, depressed in center to somewhat of a funnel shape, smooth, leathery, hairless, color varying from pale violet to reddish brown, margin somewhat inrolled or curled, flesh white and tough, cap dried leathery without rotting; Gills- extending down stalk (decurrent), widely spaced, lilac to violet at first, turning to tan with age, edges entire and smooth rather than serrated; Stalk- up to 6 cm. long, tough, covered at first with violet velvety fine hairs with thickened base; Spores- white; Habitat- found growing on stumps or trees of hardwoods or latifoliate trees (rarely conifers) from Spring through Autumn; Note- *(= Panus conchatus).*

Dyes

° grey brown
• grey brown
• • brown green
• • • blue green
• • • • purple black
• • • • • brown green

References: 19, 25, 32.

Paxillus atromentosus

Cap- up to 15 cm. wide, light brown with flattened hairs (felty-tomentose), dry, centrally depressed, margin strongly inrolled, flesh whitish to beige-yellow; Gills- bright yellow to pale brownish yellow, turning brown where bruised, running down stem (decurrent); Stalk- off center, short, fat, covered with thick velvet (velutinous) layer of dark brown-black hairs; Spores- yellowish-brown; Habitat- found in groups on decayed conifer logs and stumps, late Summer and early Fall.

Dyes

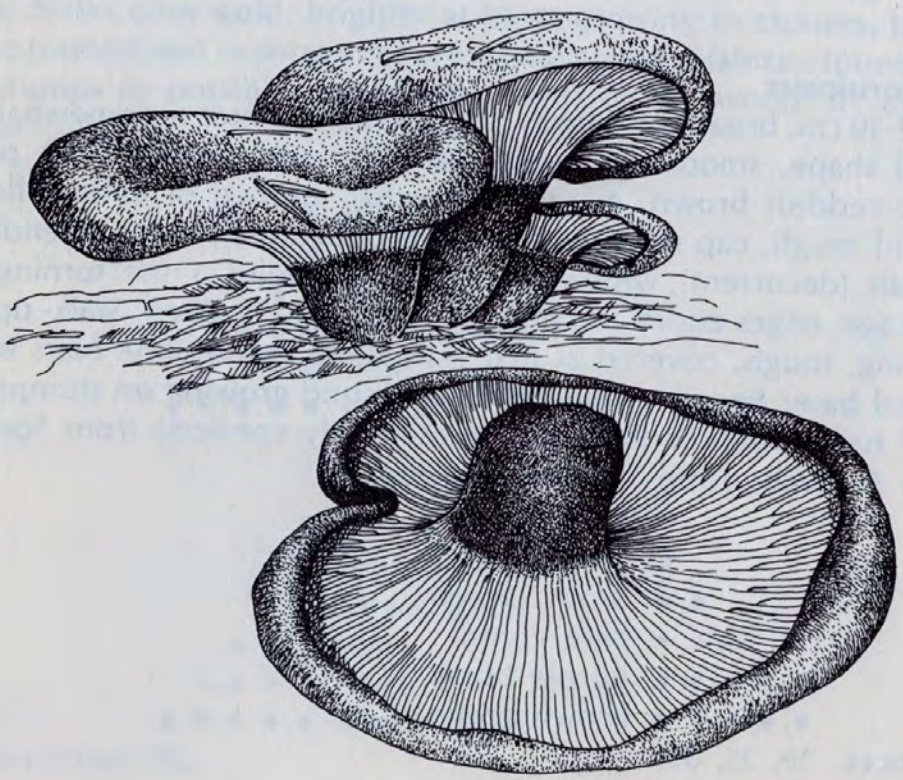
Fresh

° brown green
• purple
• • brown green
• • • navy blue
• • • • purple black
• • • • • forest green

Aged

° forest green
• lavender
• • brown green
• • • dark grey
• • • • purple black
• • • • • forest green

References: 3, 17, 25, 34.



Paxillus involutus

Cap- 5-10 cm. broad, dry, convex at first, flattening out with depression in center, margin of cap inrolled, yellowish brown felty appearance due to matted hairs (fibrillose), yellowish flesh which stains brownish where cut or bruised; Gills- yellowish-brown, extending down stalk (decurrent); staining brownish where bruised, often has intersecting gills; Stalk- short, (4-10 cm. long), thick, slightly enlarged at base, central (never off center), hairless, yellowish brown; Spore print- yellowish brown; Habitat- found in association with wood, either on it or nearby, especially conifers or mixed hardwood and conifer forests.

Dyes

° beige
• beige
• • yellow orange
• • • orange
• • • • tan
• • • • • greenish tan

References: 3, 24, 25, 34.

Pholiota kauffmanii (see after *Gymnopilus*)

Phylloporus rhodoxanthus

Cap- either maroon red or olivaceous (there are two color forms), dry, felty or almost like velvet (velutinous) though sticky when wet, slightly funnel shaped (depressed centrally), flesh is light yellow, surface sometimes cracked in age, showing yellow flesh underneath; Gills- brilliant, almost greenish yellow when first picked, widely spaced apart (distant), thick, irregular, slightly extending down stem (decurrent), gills sometimes connecting crosswise so it appears they are almost pores (anastomoses), gills bruise bluish-green at first, these bruises turning brown later; Stalk- wider at top, narrowing to a tip, reddish brown up to where gills leave striations running down stalk; Spore print- olivaceous; Habitat- found growing on ground under both hardwoods and conifers, this one in illustration was found growing under an apple tree with conifers (Douglas fir) nearby. Note- at one time looked upon as "gilled bolete" because of unusual blue bruising.

Dyes

° beige
• yellowish beige
• • beige
• • • yellowish orange
• • • • greenish tan
• • • • • tan

References: 25, 34.

Stropharia ambigua

Cap- up to 10 cm. across is maturity, rounded (convex) at first expanding to flat (plano-convex) often with a small knob or umbo in maturity, yellowish to yellow ochre when young, fading in maturity, the surface is somewhat viscid often with white cottony patches (remaining from the partial veil) on surface and fragments around the margin of the cap, white flesh; Gills- whitish when young turning purplish-brown in age with formation of spores, attached to stem; Stalk-long, up to 12 cm., light yellowish covered with white cottony patches below the ring, these patches often disappear with age; Spore print- purple brown; Habitat- found growing in soil of grassy areas, mixed and coniferous forests.

Dyes
(fresh specimen
aged 3 months)

- ○ light green grey
- • green grey
- • • green grey
- • • • greenish tan
- • • • • pale sage green
- • • • • • green grey

References: 3, 25.

Tricholomopsis rutilans *(=Tricholoma rutilans)*

Cap- up to 15 cm. across when mature, rounded (convex) expanding to nearly flat, yellowish color under a dense covering of dark reddish fibrillose scales, pale yellow flesh; Gills- yellow, notched to stem (adnexed), close; Stalk- up to 10 or 15 cm. long, same yellowish with red fibrils which cap has and will stain yellow when it's bruised; Spore print- white; Habitat- grows singly on conifer logs and stumps in coniferous forests.

Dyes

- ○ mustard
- • brown
- • • brown
- • • • mustard
- • • • • dark brown
- • • • • • brown black

References: 3, 25, 36.

Shelf Fungi (Polyporaceae)

The most noticeable shelf fungi project from living or dead trees like shelves from a wall, hence their common name. Less familiar polypores

superficially resemble mushrooms, but are covered under the cap by a layer of short, firm tubes rather than gills, as are the large shelves. The shelving type are usually woody, with the smaller members leathery. The woody ones add a new layer of pores each year, thus growing larger and larger, until the available nutrient in their particular dead log runs out. The pore layer then becomes less extensive each year, until the fungus finally starves. Shelf fungi tubes must be perfectly vertical so that the spores do not catch in the tubes as they fall to the open air. Therefore, the pore layer orients to the pull of gravity. If the log should roll, the shelf must make a new pore layer or even a whole pileus in the new proper orientation. The terrestrial mushroom-like polypores might remind one of boletes, but the tube layer of boletes is soft and rather slimy instead of firm.

A good rich source of some very potent dye and intense colors, which roam the warmer end of the color scale—oranges, yellows, browns, cinnamons, mustards, etc. However, greys, greens, black, forest greens—warm greys lurk in some species—in those as yet untried, "who knows"?

Amauroderma sp.

Cap- up to 6 cm. x 4 cm., fan shaped or kidney shaped, cinnamon brown, pale pinkish brown at margin, zoned, silky, flesh (context) is reddish cinnamon brown, somewhat felty but with hard regions, 1.5 - 2 mm. thick, radially oriented; Tubes- only one layer, .6 mm. thick, lavender-brown, pore surface is a pale grayish lavender, lighter at the margin, turning cinnamon brown with age, bruising red brown when fresh, pores are small, round, 6 to 7 per mm.; Stalk- up to 14 cm. long, 5 mm. in diameter, lateral on the caps, but sometimes appearing central due to the fact that the caps fuse laterally, the stalk may branch near the caps, also; stalk is clothed in a matte golden brown layer which is underlain by a thin hard dark brown rind about .25 mm. thick, stalk context is of the same material as the pileal context, reddish cinnamon, firm and dry; a slighter central strand occupies the middle of the stalk, this strand also is surrounded by a thin dark rind. Spores- pale brown; Habitat- abundant on roots and buttresses of dead but still upright *Tachigalia versicolor* trees in Panama, it grows in clusters on the roots during the early wet season of July-August.

Dyes (dried)

- ○ beige
- • tan
- • • sage green
- • • • golden brown
- • • • • tan
- • • • • • tan

Note: description of specie by S.D.L.B.

Echinodontium tinctorium

Fruiting body- large, 10 to 20 cm. across, woody, hoof shaped, with blackish-brown cracked rough surface crust; Flesh- bright cinnamon to cinnibar color, tough, fibery with teeth-like pores visible at the margin, pores are white when growing actively, their walls grow out irregularly resulting in flattened spine-like processes which are grey on the surface; Stalk- none, growing directly to wood in hoof shape (ungulate); Spores- white; Habitat- found year around on conifers, also known as "conk" or "Indian Paint Fungus."

Dyes (dried)

° apricot
• orange
• • brown
• • • apricot
• • • • cinnamon
• • • • • tan

Reference: 25.

Fometopsis cajanderi *(= Fomes subroseus)*

Fruiting body- leathery to corky when fresh, drying rigid, color pinkish red soon becoming pinkish brown, smooth (glabrous) to covered with matted fine hairs (compactly tomentose) when young to fibrillose with age, often with zones of different shades of pinkish brown, growing margin stays pinkish (same color as pores) while rest of cap turns brown with age; Pores- 4-5 per mm., pinkish red to pinkish brown, minute; Stalk- fruiting body (sporocarp) grown closely pressed to the wood, then the margin flares out (effused reflexed) to form the cap; Habitat- found on dead wood of conifers (rarely on hardwoods) and particularly likes logs in damp environments, year around.

Dyes all tests produce brown

Reference: 36.

Laetiporus (Polyporus) sulphureus

Fruiting body- each cap 5-20 cm. wide, sulphur yellow at growing margin, orange away from margin, weathering to almost white with age; surface smooth, often zoned, flesh whitish to yellow, growing in clusters of overlapping brackets; Pores- bright sulphur yellow; Spores- white; Stalk- almost none, each bracket growing directly from wood; Habitat- growing in overlapping, shelf-like clusters on stumps, dead tree trunks, living hardwoods and conifers, distinguished by its large size and brilliant coloration, these fungi are sometimes known as "Chicken of the Woods."

Dyes

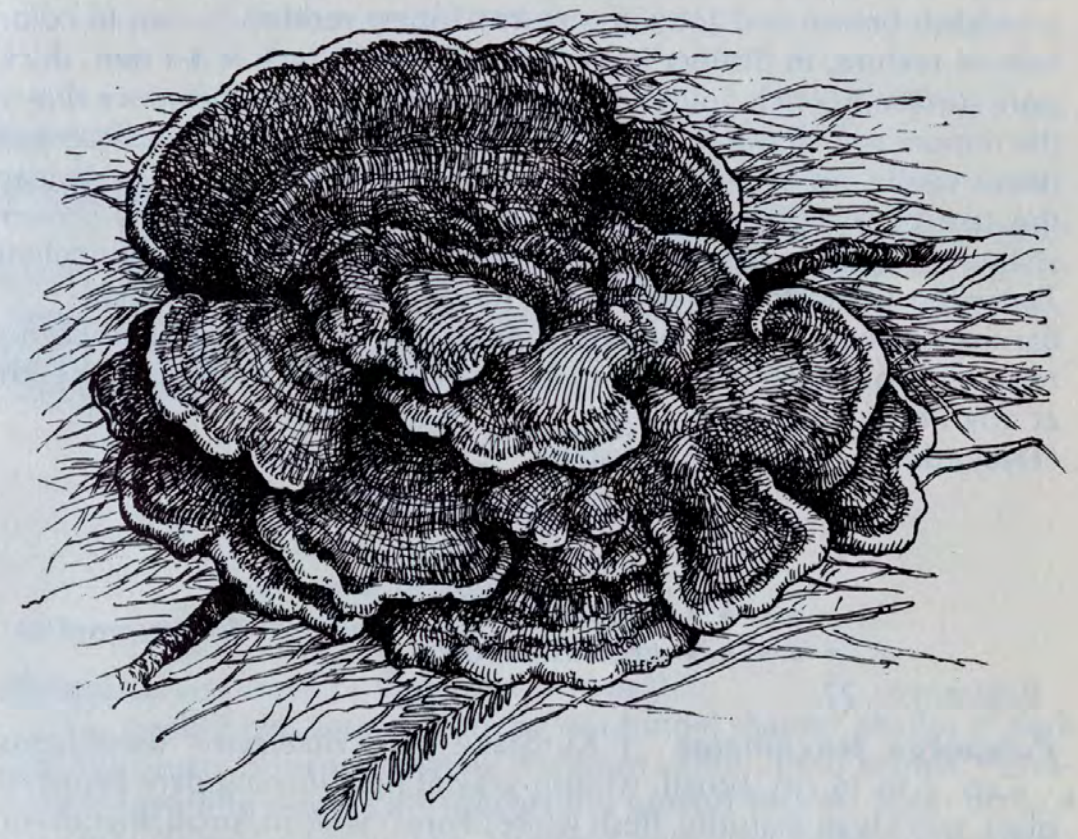
Fresh

° none
• none
• • grey
• • • pale greenish-yellow
• • • • none
• • • • • beige

Old

° yellow orange
• yellow orange
• • burnt orange
• • • orange
• • • • red brown
• • • • • dark brown

References: 3, 24, 25, 34, 36.



Phaeolus (Polyporus) schweinitzii

Cap- 12 to 30 cm. across when mature, concave or flat, layers of rosette brackets, first as a bright orangish yellow, velvety "globule" on either the ground near or on the base of stumps of conifer trees, growing and spreading out into fused cinnamon rosettes with bright yellowish-orange "blisters" in center, these "blisters" in turn develop into zonate brown rosettes with a yellow margin while still growing, flesh exudes brown staining juice while young, flesh cinnamon, spongy when young and moist, brittle and fibrous when old and dry, yellow margin turns to brown with age; Pores- greenish ochre-yellow when young, staining or bruising brown with handling, turning to dark brown

with age; Stalk- short, woody, central; Spores- whitish; Habitat- a parasite on the roots of living and dead conifers, it is often found on the lower trunk or growing up from the buried roots of conifers, it appears soon after the first rains of Fall and will remain through the Winter and throughout the year as a dried brittle bracket. New bracket growth appears in the same place each year if original bracket has been broken off.

Phellinus pseudosenex

Cap- up to 30 cm. by 15 cm., golden brown at the margin, grading into reddish brown and soon becoming very dark brown with a heavy crust (0.5 mm. thick), surface is wrinkled concentrically, but is unevenly lumpy, all but the youngest 5 cm. is covered by the crust, flesh (context) is reddish-brown and felty in texture; Tubes- reddish-brown in color, firm of texture, in distinct layers each layer of which is 3-4 mm. thick, pore surface is a rich golden brown, very smooth in appearance due to the minute size of the round pores (6 to 7 per mm.); Stalk- stalk absent, pileus sessile but broadly attached to the substratum by an area at least the size of the pileus (cap) from the top view; Spores- red-brown; Habitat- found upright on fallen dead deciduous trees (particularly *Tachigalia versicolor* Leguminosae) found by Susan D. Libonati-Barnes in Panama, and reported from Mexico and Central America, not reported from the U.S. This is a perennial sporocarp and thus is present at any time of the year.

Dyes (dried)
- ° mustard
- • mustard
- • • yellow brown
- • • • burnt orange
- • • • • yellow brown
- • • • • • greenish brown

Reference: 22.

Polyporus leucomelas ("Kurotake") *(= Boletopsis leucomelas)*

Cap- 7 to 15 cm. broad, whitish-gray at first, turning dark brownish black quickly in maturity, flesh white; Pores- whitish, small, decurrent; Stalk- whitish turning gray, solid, about same length as width of cap; Spores- light gray; Habitat- found on the ground in conifer forests. Note: This is the Japanese black mushroom (Kurotake) and can be bought in the specialty section of groceries.

Dyes
- ° forest green
- • forest green
- • • black
- • • • black
- • • • • black
- • • • • • forest green

Reference: 24.

Dyes (fresh)

New Growth
- ° yellow
- • yellow orange
- • • burnt orange
- • • • orange
- • • • • red brown
- • • • • • brown-black

Old Growth
- ° burnt orange
- • burnt orange
- • • red brown
- • • • red brown
- • • • • red brown
- • • • • • dark brown

References: 17, 25.

Polyporus melanopus gp.

Cap- 2-5 cm. across, brownish buff, dry, depressed in center, row of darker, flattened hairs toward outer edge, thin flesh; Pores- whitish to cream; Stalk- blackish-brown, central; Habitat- on hardwood trees, stumps or logs in Spring and Fall, common.

Dyes (dried)
- ° beige
- • light yellow brown
- • • beige
- • • • light green brown
- • • • • mustard
- • • • • • greenish tan

Reference: 32.

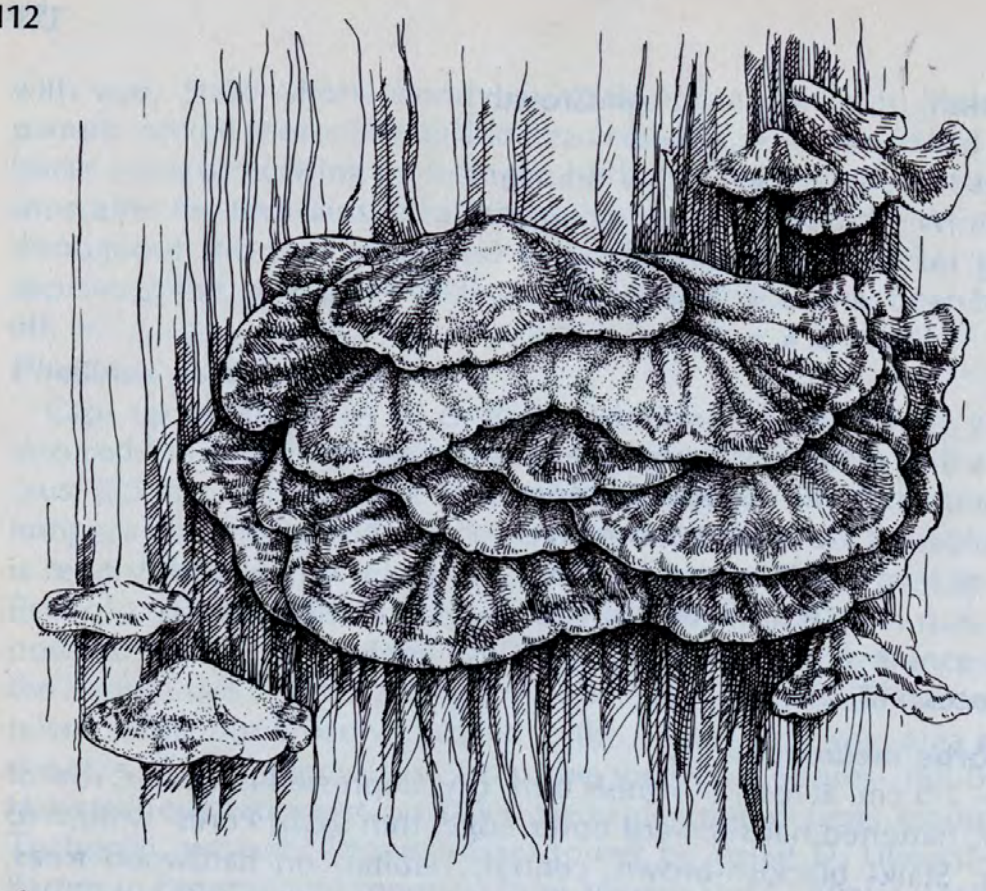
Polyporus perennis *(= Coltrichia perennis)*

Cap- up to 8 cm. across, more or less funnel shaped, shades of dark and light rusty browns radiating out from center, flesh brown; Pores- small, extending down stalk (decurrent) greyish-brown; Stalk- up to 4 cm. long, same color as cap, covered with fine hairs (tomentose); Spores- yellowish brown; Habitat- found in woods where soil is sandy and often where area has been burned over.

Dyes (dried)
- ° beige
- • beige
- • • beige
- • • • orange
- • • • • greenish tan
- • • • • • beige

References: 17, 32.

Polyporus schweinitzii (see *Phaeolus schweinitzii*)



Polyporus sulphureus (see *Laetiporus sulfureus*)

Polyporus tomentosus *(= Mucronoporus tomentosus)*

Cap- up to 16 cm. across, dark "rusty" brown, surface concave, dish-shaped with a "suede"-like texture when wet, small upright stiff hairs surrounding the depression in center of cap, concentric rings of darker brown radiating out 2/3 distance from center, leading edge of cap can continue growing into "rosette" as *Phaeolus schweinitzii* does; Flesh- cinnamon to ochre where broken, (cherry red, then black w/KOH solution); Spores- large, dark brown; Pores- yellowish brown when young, soft, spongy, darkening to brown when mature; Stalk- short, lateral, excentric or central, semi-woody in texture, dark brown outside, cinnamon-ochre inside; Habitat- found in Fall and Winter; like *P. schweinitzii*, this fungus is a parasite on the roots of conifers and is found on the ground at the base of, or near vicinity of conifers.

Dyes

Fresh

° golden brown
• golden brown
• • golden brown
• • • burnt orange
• • • • brown
• • • • • golden brown

Dried

° golden brown
• golden brown
• • red brown
• • • burnt orange
• • • • brown
• • • • • dark yellow brown

Reference: 25.

Polyporus versicolor (see *Trametes versicolor*)

Ungulina fomentaria *(= Fomes fomentaria)*

Fruiting body- up to 40 cm. in diameter to 20 cm. vertically; hoof shaped gray colored smooth crust has grooves in a concentric fashion with a lighter rounded margin, older specimens are darker brown with a lighter ochre/cinnamon margin; Flesh- reddish brown with a corky texture; tubes rusty brown; Pores- tubes rusty brown, tube mouths (pores) small, ashen in color at first, then turning ochre with age; Spores- whitish; Habitat- found on living or dead trees where it will grow for several years.

Dyes (dried)

° beige
• mustard
• • yellow brown
• • • mustard (gold when fresh)
• • • • light brown
• • • • • dark brown

Reference: 25.

Trametes (Polyporus) versicolor *(= Coriolus versicolor)*

Fruiting body- Caps 2-5 cm. broad, growing abundantly in overlapping leathery clusters, variety of colors greenish, tan, white, yellow, zonate, surface almost velvety because of a layer of fine hairs (velutinous); Pores- white, minute, 4 to 5 per mm.; Stalk- none or short; each bracket attached directly to wood or branch; Spores- white; Habitat- common on both dead hardwoods and conifers, widely distributed, growing on branches, stumps, and logs.

Dyes

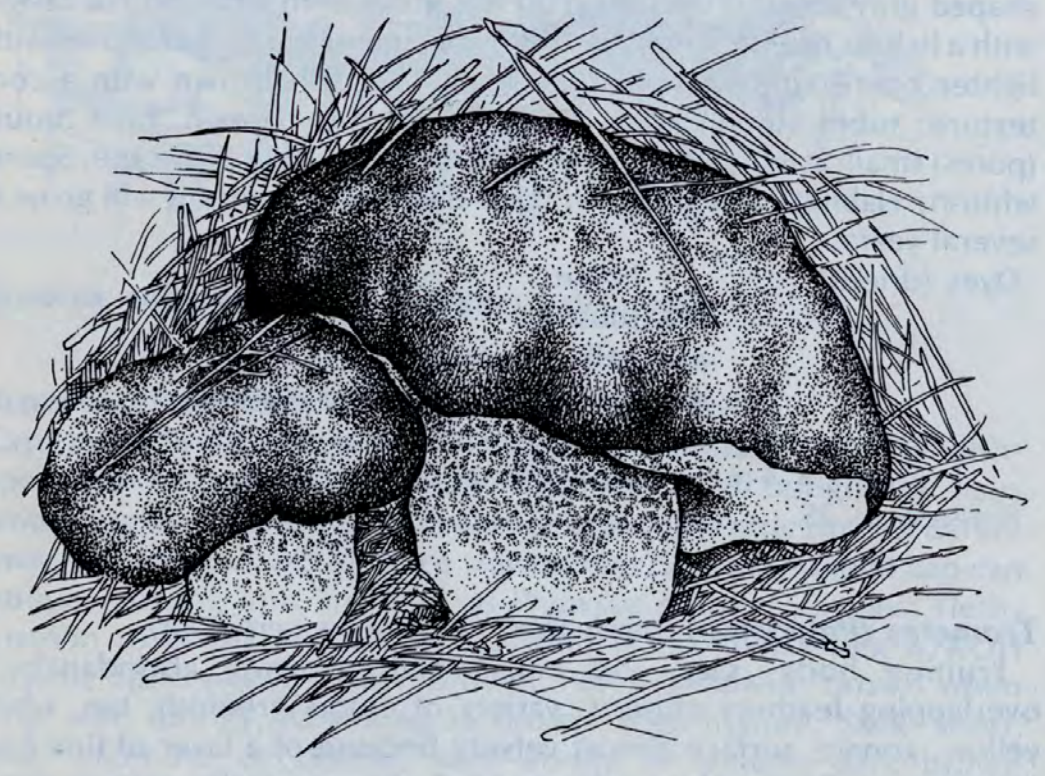
warm grey
warm grey
silvery green-grey
warm grey
greenish tan
grey-blue

References: 17, 25.

Boletes (Boletaceae)

Boletes are fungi in which the fruiting body is fleshy and the spores are borne in tubes. They can be distinguished from most shelf fungi (ie. polypores) by the fleshiness of the fruiting body. They can be distinguished from those polypores in which the fruiting body appears fleshy by the tubes which can be easily removed from the pileus (cap).

This readily identifiable "sponge" group perhaps gives the more consistent oranges, yellows, tan, olive green, burnt-orange complex—a more limited palette to date. Older, mature specimens seem to be the key to dye potency. The tubes themselves bear most of the color producing chemicals.



Boletus aereus

Cap- up to 15 cm. broad, rounded convex when young to plano-convex in age, dark brownish blackish at first fading to a lighter brown in age, the margin is somewhat irregular and inrolled at first in young specimens then becomes even and smoothly curved in maturity, surface is somewhat pitted with depressions and irregular patches of lighter color; Tubes- white at first, then turning yellowish in age, tube mouths or pores are comparatively large (l mm. across) and angular in shape, and do not change color where bruised; Stalk- buffy-beige color turning toward brown in age with a conspicuous netting of reticulations

over upper half; Spore print- dark olive brown; Habitat- scattered to numerous in soil under oak and madrone trees; Note- somewhat similar to *Boletus edulis* in aspect, except for the dark blackish-brown cap that never becomes viscid.

Dyes
- ° ---none
- • lemon yellow
- • • tan
- • • • orange
- • • • • olive green
- • • • • • olive green

References: 36, 38.

Boletus edulis

Cap- 10 to 25 cm. across in maturity, convex in shape, expanding to nearly flat in maturity, dry, smooth, but with a viscid or sticky appearance in wet weather, light brown at first, darkening to cinnamon brown with a paler margin in maturity; Tubes- whitish at first, then

turning to yellowish brown in age, depressed at stalk, tube mouths (pores) small (2-3 per mm.) and angular in shape, same color as tubes sometimes bruising brown; Stalk- up to 20 cm. long, slightly to very bulbous at base, yellowish white to yellowish brown coloration, with a net of white reticulations over all, but more obviously covering upper 1/3 of stalk; Spore print- olive brown; Habitat- commonly found on the ground under pines (more rarely under hardwoods) from late Summer through Fall.

Dyes (tubes only)
- ◦ yellow
- • greenish yellow
- • • golden brown
- • • • orange
- • • • • mustard-brown
- • • • • • mustard

References: 24, 25, 34, 38.

Boletus eastwoodiae

Cap- 10 to 15 cm. broad at maturity, convex in shape when young to almost flattened in maturity (plano-convex), dark reddish to olivaceous brown, flesh bright yellow, immediately turning blue where cut or

bruised; Tubes- yellow tubes with dark red tube mouths (pores) which are quite small (up to 1 mm. across) and angular in shape, tubes and pores also turn blue as soon as touched or bruised; Stalk- up to 15 cm. long, thick, a light reddish brown in color with a dark red network of veins (reticulations) covering 2/3 to all of the slightly bulbous stalk, bruises blue instantly; Spores- brownish-olive; Habitat- found growing on soil in coniferous and mixed coniferous and hardwood forests, considered to be rare, it has been found only along the Pacific Coast.

Dyes
- ◦ tan
- • tan
- • • tan
- • • • ---
- • • • • brown
- • • • • • olive green

References: 24, 25, 34, 38.

Boletus granulatus *(= Suillus granulatus)*

Cap- 5 to 15 cm. broad, convex at first, broadening in maturity, viscid or glutinous surface (to slimy when wet), often streaked cinnamon brown over a lighter buff colored surface, flesh is pale yellow, not changing color where bruised; Tubes- pale yellow, staining cinnamon where bruised, almost descending down stalk (subdecurrent); Stalk- up to 10 cm. long, white with yellow at apex of stalk, and cinnamon brown toward the tapered base, covered with reddish brown dots or granules (glandular dots); Spores- cinnamon; Habitat- sometimes called a "slippery jack," this bolete is commonly found under pines during the summer and fall.

Dyes
- ◦ beige
- • warm tan
- • • tan
- • • • orange
- • • • • tan
- • • • • • beige

References: 3, 24, 25, 38.

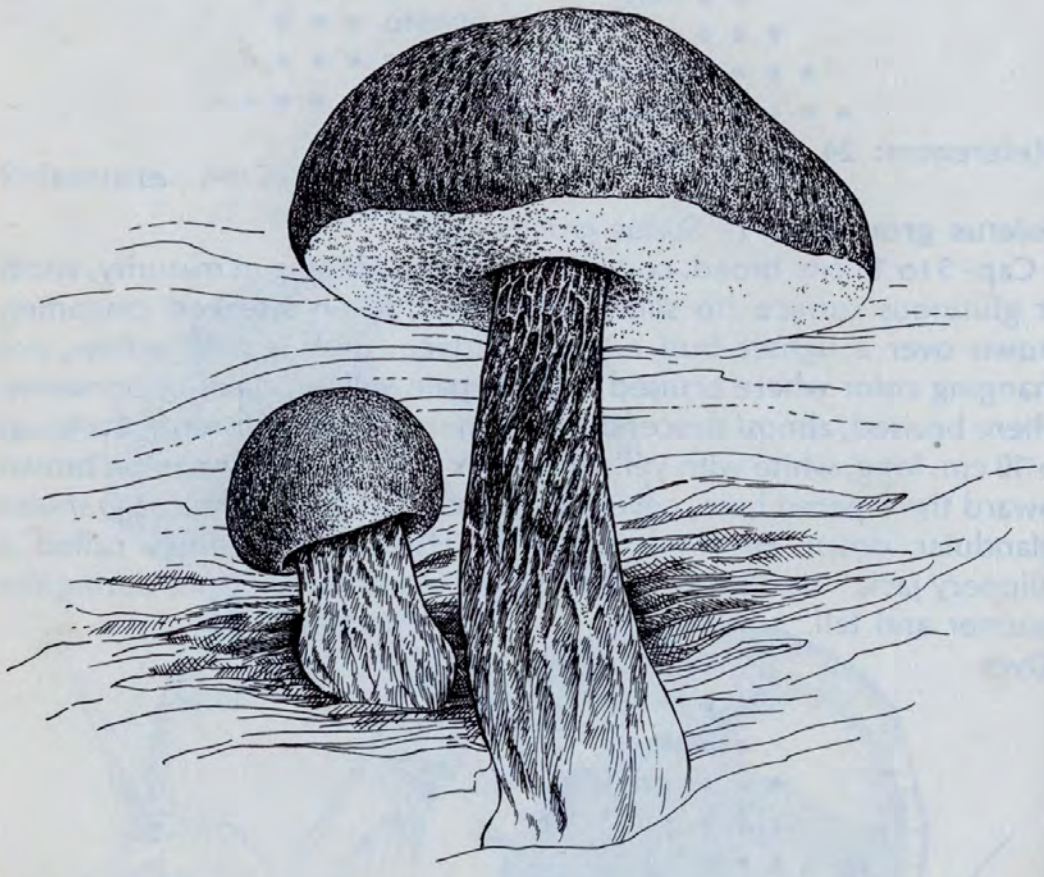
Boletus grevillei *(= Suillus grevillei)*

Cap- up to 15 cm. across, "egg shaped" convex to widely convex, glutinous or slimy, cap varying in color from bright yellow to deeply reddish, flesh a pale lemon yellow, veil is pale lemon yellow with a portion often visible on margin of cap; Tubes- yellow with yellow pores which bruise brown, touching the stalk in almost decurrent fashion without any depression around apex of stalk; Stalk- up to 10 cm. long, slightly enlarged toward base with a thick cottony veil remaining from veil, reticulations (net) can be seen on the yellowish stalk sbove the

ring and surface is a streaky reddish brown below the ring; Spores- dull olivaceous cinnamon brown; Habitat- often found growing in groups under or near larch, especially after heavy rains of Summer and Fall.

Dyes
- ° ---(no color)
- • beige
- • • olive green
- • • • burnt orange
- • • • • olive green
- • • • • • tan

References: 3, 25.



Boletus mirabilis

Cap- 5 to 16 cm. across, convex in shape becoming broadly convex in maturity, dark reddish maroon brown, hairy or wooly texture on surface of cap, (appressed-fibrillose when young to fibrillose-scaly in maturity), flesh is lemon yellow, unchanging when bruised; Tubes- bright yellow turning to a greenish mustard yellow with age, tube mouths (pores) either angular or round, up to l mm. across and sometimes bruise a deeper yellow, tube area noticeably depressed around stalk; Stalk- up to 20 cm. long, sometimes bulbous at base and tapering upward, a net of large white reticulations is evident over the entire surface, especially near the apex where the surface sometimes

appears to be almost "pitted," surface appears streaked with maroonish brown; Spores- olive brown; Habitat- found frequently on wood (on conifer stumps and decaying logs) or on the soil in close association to wood during the summer and fall in the coastal regions of the Pacific Northwest.

Dyes
- ° pale mustard
- • pale mustard
- • • tan
- • • • orange
- • • • • olive green
- • • • • • olive green

References: 3, 24, 25, 38.

Boletus piperatus

Cap- 2-8 cm. across, convex in shape at first becoming flattened in maturity, dry, smooth except for felted hairs along margin of the cap, reddish-brown, somewhat viscid during wet weather, flesh is a yellowish beige at first changing to pink; Tubes- yellowish with dark rusty red tube mouths (pores), pores are rather large (l to 2 mm.) and angular in shape; Stalk- up to 8 cm. long, about same yellowish brown color as cap with a distinctive bright yellow mycelium at the base (of stalk); Spores- cinnamon brown; Habitat- commonly found in soil under conifers.

Dyes
- ° mustard
- • mustard
- • • yellow brown
- • • • burnt orange
- • • • • greenish brown
- • • • • • olive green

References: 17, 25, 38.

Gastroboletus turbinatus

"Cap"- small (2 to 8 cm. broad), convex, felty, blackish-brown often with reddish spots, dry, flesh yellow to pinkish, bruising blue, aspect of this whole fungus is twisted, contorted and irregular in comparison with "typical" boletes; "Tubes"- irregular, yellow to reddish, turning blue immediately when bruised, the tubes are so contorted so that the mouths of the tubes can never really open to emit spores, so no spore print can be obtained; Stalk- very short, contorted, having a "marbled" appearance with yellowish-orangish-red, bruises blue, no ring; Spores- not evident; Habitat- found in soil under conifers, commonly in association with red and white fir.

Dyes
- ° lemon yellow
- • mustard
- • • cinnamon

• • • burnt orange
• • • • yellow
• • • • • brown

References: 25, 38.

Leccinum manzanitae

Cap- 5 to 20 cm. broad, convex in shape at first, expanding to almost plane in age, dark "Mahogany" red to dark reddish brown, fine flattened hairs (appressed fibrillose) but becoming sticky or viscid in wet weather, flesh is whitish but turning smoky grey-lilac overtones where injured or cut, depressed at stalk; Tubes- olive-buff at first, changing to darker shade in age, tube mouths (pores) turn to a dark brown where bruised; Stalk- whitish, covered with dark greyish-black squamules or tufts of hair which look like points, stalk slowly changes color to grey lilac where cut or injured; Spores- brown; Habitat- commonly found on ground under madrone trees and manzanita shrubs in forests of coastal zone of California.

Dyes
◦ ---(no color)
• apricot
• • ---sample lacking
• • • burnt orange
• • • • tan
• • • • • warm grey

Reference: 38.

Pulveroboletus ravenelii

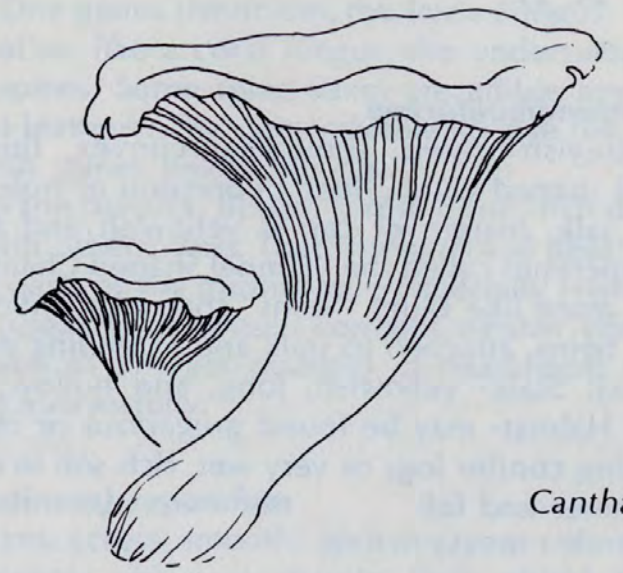
Cap- 5 to 15 cm. across in maturity, convex in shape when young, expanding to almost flat (plano-convex) with age; somewhat viscid with a light pinkish-brown surface color covered with reddish brown fibrils, a billiant sulphur yellow, dry, cottony (flocculose) appearing veil covers the entire cap at first, but with age there may be only a few tufts left on surface of cap, flesh is a pale ivory buff to yellowish which turns blue when bruised; Tubes- both tubes and tube mouths (pores) are brillant yel-low when young, turning a darker shade of yellow in age and bruising bluish; Stalk- up to 12 cm. long, yellowish with the remnants of the bril-liant yellow veil appearing ring-like around the stalk; Spores- dark olive brown; Habitat- found growing alone in mixed woods (most com-monly under oaks) during Fall and Winter.

Dyes (tubes)
◦ lemon yellow
• gold
• • greenish yellow
• • • orange
• • • • greenish yellow
• • • • • olive green

Reference: 38.

Suillus granulatus (see *Boletus granulatus*)

Suillus grevillei (see *Boletus grevillei*)



Cantharellus cibarius

Chanterelles (Cantharellaceae)

The undersurface of the cap is outfitted with a series of interconnected veins, a stalk is present, and the cap is frequently uplifted at the margin. The old genus *Cantharellus* has been subdivided into *Gomphus* and *Cantharellus* based upon spore color differences. Hence, some mushroom guides will list one name, and some the other. Although the veins of chanterelles superficially resemble gills, microscopical evidence reveals that the chanterelles are most closely related to the coral fungi.

To date this group has not revealed a particularly wide color spectrum; instead the dyes are mainly tans, beiges, and a somewhat elusive lavender.

Cantharellus clavatus (=*Gomphus clavatus*)

Cap- purplish brown, usually depressed in center with a very wavy lobed margin, smooth, somewhat funnel shaped, flesh whitish, sometimes known as "Pigs Ears;" Gills- look more like veins than traditional gills, interconnecting and forked, light purplish brown to lavender, extending down the stalk all the way to base; Stalk-emerging from base into funnel shaped cap: Spore print-brown; Habitat- found growing in groups in conifer forests during late summer and fall.

Dyes
◦ ---
• ---

• • ---
• • • ---
• • • • ---
• • • • • lavender!

References: 3, 24, 25.

Cantharellus infundibuliformis

Cap- dark greyish-brown, somewhat convex, thin cap which becomes funnel shaped with a deep depression or hole in the center extending into talk, margin of cap is yellowish and appears to be "scalloped," sometimes called the "Funnel Shaped Chanterelle"; Gills- yellowish-grey, more like blunt "veins" than conventional gills, with forks and cross beins, attached to stalk and extending down it a short ways (decurrent); Stalk- yellowish, long, and hollow; Spore print- creamy yellow; Habitat- may be found gregarious or clustered on or adjacent to rotting conifer logs or very wet, rich soil in conifer forests during late summer and fall.

Dyes
° ---
• beige
• • grey
• • • tan
• • • • grey
• • • • • tannish-grey

References: 24, 34.

Craterellus cornucopioides

Cap- up to 6 cm. across the top of this grayish brown to blackish, trumpet shaped hollow cap; surface is covered with somewhat stiff hairs and small scales; flesh is brownish, thin and somewhat brittle; this fungus is sometimes called the "Horn of Plenty." Gills- no real gills, this spore bearing surface is wrinkled and uneven without any consistant pattern to them, blackish grey in color, the surface is sometimes smooth as well as wrinkled; Stalk- greyish-brown, short, extending immediately up into trumpet shaped cap; Spore print- white; Habitat- found often growing in clusters in soil under oak and other hardwoods throughout late summer and fall.

Dyes
° ---
• beige
• • beige
• • • greenish brown
• • • • tan
• • • • • beige

References: 25, 34.

Spine or Teeth Fungi (Hydnaceae)

Spine-like projections cover the undersurface of the caps of hydnaceous fungi. The sporocarps are of all types, from pileate-stipitate to resupinate. One genus (*Hericium*, the Icicle Fungus) consists of a set of branches, rather like a coral fungus, the undersurface of which is covered with spines. Some spine fungi are edible and fleshy, others very tough and leathery. The ones valuable for dye resemble common mushrooms with spines below the cap.

In this group the purples, BLUES, forest green, rich dark browns are found along with other colors. Their strength and depth of color seem to reside in all parts of the mushroom—expecially *Hydnellum* (corky). Comparitively speaking, *Hydnum* contains weaker color; that is less intensity—as well as a larger quantity of mushroom to wool ration needed to dye successfully.

Hydnum (Dentinum) repandum

Cap-2 to 10 cm. across, smooth, apricot-cream colored to tan, often depressed in center with wavy margin, flesh whitish to apricot, soft; Spines- whitish to like apricot color, thick, descending onto stalk; Stalk- same color as cap, often off center; Spores- white; Habitat- found singly or in groups on the ground, often in thick duff in conifer woods during Fall and Winter.

Dyes: none with any mordant.

Reference: 24.

Hericium erinaceus

Fruiting body- this unusual and easy to recognize fungus has a rounded white, fleshy fruiting body with long white spines (up to 3 cm. long) hanging from it, the whole fungus will turn beige-tan with age; Spore print- white; Habitat- found singly growing on the wounds of mature, living hardwoods.

Dyes
° beige
• beige
• • beige
• • • tan
• • • • greenish tan
• • • • • beige

References: 25, 34.

Hydnellum aurantiacum

Cap- 5-15 cm. across, white, velvety and flat at first turning to orange (brownish in the center) and depressed in age, flesh tough, zoned, *no* red drops exuded on surface; Stalk- equal, felty, orange-brown;

Spores-brown; Habitat- on the ground under conifers.

Dyes

- ◦ ---
- • blue green
- • • blue green
- • • • forest green
- • • • • olive green
- • • • • • grey green

References: 17, 25.

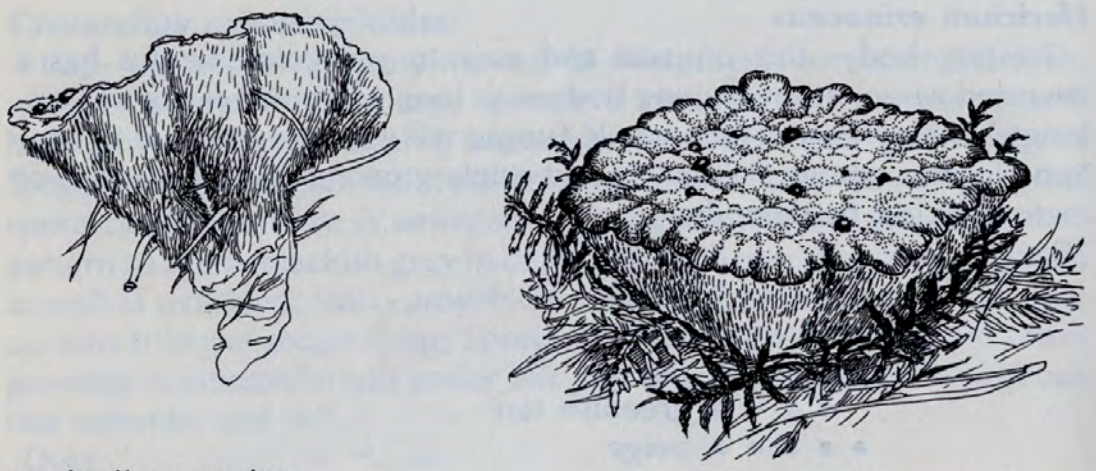
Hydnellum caeruleum

Gathered at Stuntz Foray, Mendocino, December 1, 1978. Specimen had been picked for two days when drawn. Cap-light bluish with pink tinge on rim, darkening to a brownish-black in center, cap up to 30 cm. across in maturity, farinaceous odor; Spines- short, pale whitish-blue in young specimens, darkening to brown with age; Stalk- short, woody in texture; Habitat- found growing in moss, under redwood and fir in Mendocino County, California.

Dyes

- ◦ tan
- • grey blue
- • • grey green
- • • • light blue
- • • • • brown green
- • • • • • dark forest green

Reference: 34.



Hydnellum peckii

Hydnellum peckii (=*diabolus*)

Cap- 5-15 cm. broad, very young specimen white, felty almost velvety nodules in center with pinkish tinge to rim of cap, exuding red drops of liquid when fresh, older specimen turns darker brown in the center

with a pale salmon pink margin, nodules (clumps of hyphae) turn dark brown, felty and with lateral expansion of cap can becomes tomentose in appearance; Spines- light pinkish when fresh, turning darker pinkish brown with age; Odor- very sweet, resinous; Stalk- dark brown; Spore- fawn brown; Habitat- this specimen found growing in moss, under mixed conifer in transtitional pygmy forest of Mendocino County.

Dyes

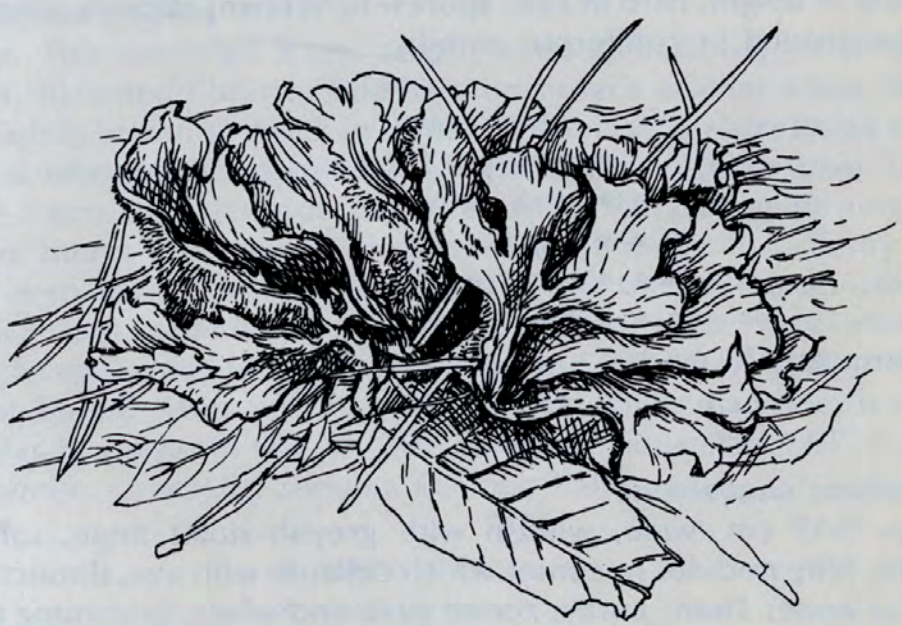
Fresh

- ◦ tan
- • grey
- • • forest
- • • • dark forest green
- • • • • greenish brown
- • • • • • olive green

Dried

- ◦ brown
- • warm grey
- • • greenish brown
- • • • brown green
- • • • • dark brown
- • • • • • forest green

References: 7, 24, 25.



Hydnellum sp.

Cap- large, this specimen close to 30 cm. across, dark orangish brown in center of each lobe, light whitish buff toward edge of margin of each lobe, leathery texture on surface, lobes overlapping, each lobe having spines underneath it; Spines- light buff, turning darker brown with age;

Stalk- dark brown, woody texture, off center; Habitat- found growing under huckleberry, madrones and pines of transitional pygmy forest in Mendocino County, California. (This specimens seems close to *Hydnellum scrobiculatum.*)

Dyes

° sage green
• sage green
• • sage green
• • • sage green
• • • • ---
• • • • • forest green

Reference: 7.

Hydnellum scrobiculatum

Cap- 3-10 cm. across, slightly convex, later expanding to flat or depressed, surface rough, deeply pitted, sometimes with smaller caps on top, bearing spines (see illus.), surface is soft at first, almost felty, pale "salmon buff" darkening to brown with age, turns blackish-red where rubbed, especially toward rim, flesh thick in center, thin on margin, becoming deep reddish brown. In wet weather the surface exudes droplets of red juice. Spines- short (1 to 3 mm. long), extending down stem, pale buff at first, becoming brownish with age; Stalk- variable in length, hard in age; Spores- light fawn; Habitat- gregarious, on the ground in coniferous woods.

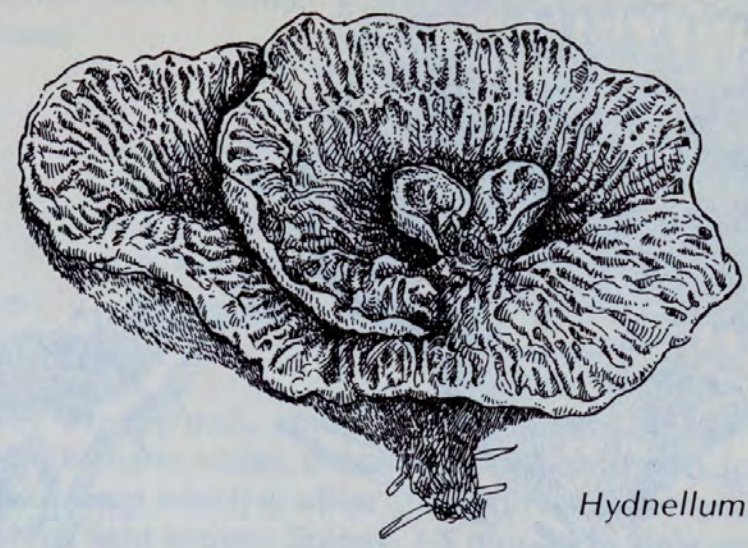
Dyes

° dark brown
• greenish brown
• • dark brown
• • • black
• • • • dark brown
• • • • • brown black

Reference: 7.

Hydnellum suaveolens

Cap- 5-15 cm. wide, whitish with greyish-violet tinge, soft felty texture, felty nodules in center which collapse with age, distinct sweet odor of anise; Flesh- corky, zoned drab and white, becoming darker blue or green on exposure, especially toward base; Spines- crowded, light beige, darkening with age, up to 7 mm. long; Stalk- short, woody with deep blue mycelium (Miller says stalk bright violet) (Coker says stalk zoned indigo blue to blackish); Habitat- found growing on the ground either singly or in groups under mixed conifer.



Hydnellum suaveolans

Dyes

° warm grey
• grey green
• • sage green
• • • green
• • • • sage green
• • • • • blue green

References: 7, 25.

Hydnellum regium

Cap- This specimen 9 cm. across, smooth, shallowly pitted toward center, flattened fibrils or fine hairs on surface evident when cap was wet, lightly brownish-black in center, lightening to warm beige toward margin, when broken open flesh was violet with lavender tinge; Spines- about 3 mm. long, lavender-brownish when first picked, turning dusty brown after a few days; Stalk- tough, corky rather than fleshy, same color as spines on outside, pinkish-beige with lavender tones inside, off center, short, tapered at base, stalk became quite hard when dry though cap stayed "fleshy"; Spores- brown; Habitat- found growing in almost buried deep duff of tan bark oak, some madrone, scattered Douglas fir on north side of open woods in November 1977, during a dry winter, Cazadero, Sonoma County, California

Dyes

° warm grey
• warm grey
• • sage green
• • • dark sage green
• • • • dark sage green
• • • • • forest green

Reference: 36.

Hydnellum tomentosus (=*Phellodon tomentosus*)

Cap- 6 1/2 cm. across, older specimen, pinkish-beige rim, slightly darker along outer edge, with black tomentose hairs in the center; Flesh-warm beige color with "woody" fibrous texture; Spines- dark brown, (may have been lighter when first picked); Stalk- short, woody, dark brown; Habitat- inclined to be found in groups under conifer, huckleberry, this illustrated specimen found in transitional pygmy forest in Mendocino County, California.

Dyes

° golden brown
• brown
• • greenish brown
• • • green brown
• • • • dark brown
• • • • • brownish-green

Reference: 7.

Hydnellum zonatum

Cap- up to 8 cm. wide, thin, pliable, surface dull, lightly felted turning more shiny with age, shape is plane at first becoming depressed radiating outward in distinct zones through cinnamon to pinkish buff at the tin margin, flesh is thin; Spines- short (1 to 2 mm. long) slender, crowded, pinkish near the edge to darker brown toward the center, decurrent; Stalk- up to 4 cm. long, thick, same color as cap, thickened

below; Spores- fawn; Habitat- gregarious in mixed woods.

Dyes (dried)

° brown
• brown
• • greenish brown
• • • black
• • • • brown
• • • • • brown

References: 7, 17.

Hydnum fennicum

Cap- 3-11 cm. broad, smooth when young becoming scaly, sometimes with coarse scales, overall color is brown with darker brown scales and a margin which is white and incurved when young, flesh is soft, whitish to light brown; Spines- 3-5 mm. long, delicate, crowded, buff with nearly white tips when young, changing to dark brown with lighter tips in age; Stalk- long, same color as cap, tapering to a point which is blackish-olive at base; Spores- fawn; Habitat- single to many (gregarious) in frondose woods.

Dyes

° cinnamon
• brown
• • dark brown
• • • blue-black
• • • • brown
• • • • • brown

Reference: 7.

Hydnum fulgineoviolaceum

Cap- 3-7 cm. wide, convex, slightly depressed in center with a thin, slightly incurved margin, surface texture somewhat felted, color a light brown to vinaceous light brown in age, flesh color slightly violet, light brown in mature plants; Spines- short, pointed, crowded, pale whitish with tinge of salmon at first, soon turning the same color as cap, with tips remaining lighter until maturity, extending slightly down stem (decurrent); Stalk- tapered to blunt point, somewhat bent or irregular, same color as cap, base tinted with dark blue green or greenish black; Spores- light warm brown (fawn); Habitat- mixed woods.

Dyes

° grey
• warm grey
• • grey brown
• • • grey brown
• • • • grey brown
• • • • • warm grey

Reference: 7.

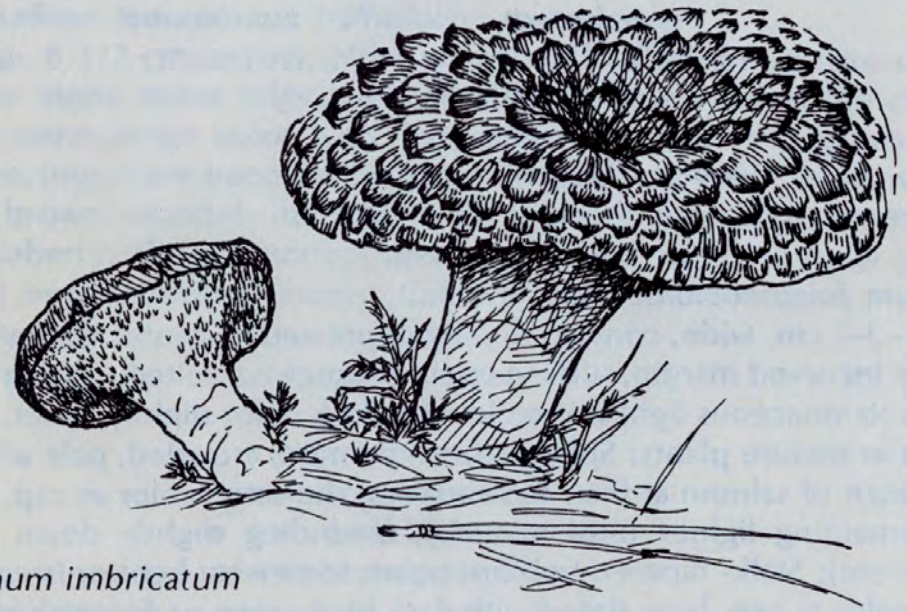
Hydnum fuscoindicum

Cap- about 4 cm. across (this specimen), dark violet with "suede" texture with very minute (fibrils) hairs, cap had almost the same quality of "iridescence" that a *Cortinarius violaceus* has when fresh, flesh of cap violet when broken open and stayed violet as cap dried, fleshy, rather than corky; Spines- thick, widely separated like the teeth on *Dentinum repandum* rather than the close and fine spines on *H. regium*. Spines do *not* descend stalk. Stalk- long, about 7 cm., fleshy, off center, slightly lighter violet than cap, smooth, tapering down to a definitely pointed, whitish (with mycelium) tip; Spores- fawn; Habitat- found several growing solitary in deep duff of tan bark oak, madrone, Douglas fir, open in November, 1977 - a winter of little rain.

Dyes (dried)

° warm grey
• green grey
• • green
• • • green
• • • • greenish brown
• • • • • grey green

References: 36.



Hydnum imbricatum

Hydnum imbricatum

Cap- 8-20 cm., a large, dry, fleshy, convex at first, then flat and centrally depressed light brown with greyish tinged cap, covered with large dark brown, coarse, raised scales, flesh is greyish buff; Spines- long, 5 to 15 mm., whitish in color, turning greyish brown with age, extending down stalk slightly; Stalk- 5-10 cm. long, light brown, smooth and dry, sometimes sporocarps are fused at base of stalk, forming clumps of these fungi; Spores- brown; Habitat- found in Fall in moist

coniferous forest or mixed conifer, hardwood; Note- *Hydnum scabrosum* is a similar but smaller species.

Dyes

Fresh (but old)

° warm grey
• green blue
• • grey green
• • • blue
• • • • forest green
• • • • • greenish blue

Dried

° grey
• grey
• • blue grey
• • • blue
• • • • green grey
• • • • • green grey

References: 3, 25, 34.

Hydnum scabrosum

Cap- similar to *Hydnum imbricatum* in over all appearance, but smaller (3-10 cm.), cap is a darker, vinaceous brown with less coarse scales than *H. imbricatum*, flesh is soft, light brown with a mild, farinaceous odor; Spines-short (3-5 mm. long), light brown with a mild, paler tips; Stalk- same color as cap, tapering down to a blackish-green tip; Spores- fawn brown; Habitat- often found in large groups (gregarious) in mixed conifer and hardwood forests.

Dyes

° beige
• olive green
• • olive green
• • • olive green
• • • • olive green
• • • • • olive green

References: 24, 25, 34.

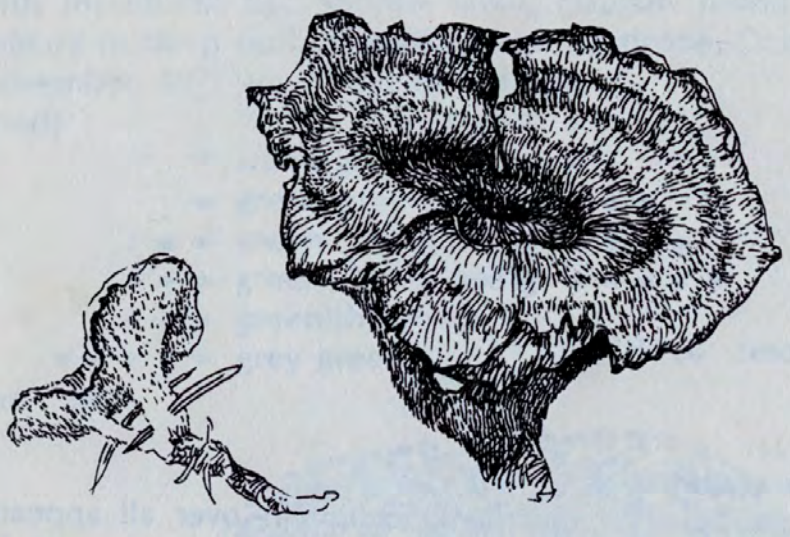
Hydnum stereosarcinon

Cap- this specimen 21 cm. broad, fleshy, smooth, soft, beige to medium brown, collapsing in center with age or continuous rain, deeply depressed in center, with large lobes, drooping margin, this specimen a cluster of two rosettes; Spines- same color as cap, darkening with age; Stalk- short, woody; Spores- brown or fawn

brown; Habitat- growing on moss, under conifer.
Dyes

° tan
• grey blue
• • greenish blue
• • • grey blue
• • • • greenish blue
• • • • • grey blue

References: 36.



Phellodon atratum

Cap- small, this specimen about 6 cm. across, grey brown, smooth, almost silky when dry, concentric rings varying in color just slightly from each other (should have a blue-black pileus when fresh); Spines- pinkish at first, short, darkening with age (stain black upon bruising); Stalk—dark brown, woody; Spores- white; Habitat- found in Fall, Winter growing on moss under conifer.
Dyes

° grey green
• grey green
• • blue green
• • • sage green
• • • • green
• • • • • grey blue

References: 35.

Phellodon niger (=*Phellodon alboniger*)

Cap- 2-7 cm. broad, convex at first, but expanding in maturity to plane with an irregular margin, greyish buff, slightly tinted bluish at margin, bruising black, tomentose-fibrillose, flesh in two definite

layers, the top one the same color as cap surface and soft, lower surface black and hard; Spines- 2-4 mm. long, slender, crowded, light gray at first, then grayish brown with slight tinge of pink; Stalk- 4-6 cm., same color as cap, but hard and black inside, wider at base with large amount of spongy material below surface of soil; Spores- white; Habitat- Solitary or in groups, in thick duff in mixed woods.
Dyes

° grey blue
• green grey
• • green grey
• • • green grey
• • • • olive green
• • • • • grey blue

References: 7, 17.

Phellodon tomentosus (see *Hydnellum tomentosus*)

Wrinkle Fungi (Meruliaceae)

This group is distinguished by the layer of wrinkles below the cap. The most common members are effuso-reflexed, thus resembling the leathery shelf fungi rather than the mushrooms. Their consistency is soft to rubbery, never really fleshy or rough. The dye fungus *Merulius tremellosus* is reminiscent of floppy plastic insects.

Merulius tremellosus

Cap- 1-5 cm. across, growing in bracket-like form, gelatin-like consistency, with top surface having a light grey womewhat wooly texture; Pores- light pinkishk-orange shallow pores; Stalk- none, fungus growing closely pressed to wood, then flaring out to form bracket-like caps (effused reflexed); Habitat- found during Fall and Winter on old rotten stumps.
Dyes

° beige
• blue green
• • grey green
• • • blue green
• • • • green
• • • • • blue green (brownish)

Reference: 17.

Unpatterned Fungi (Thelephoraceae)

The spore-producing surface of these fungi can be described as "unpatterned." This means that it consists of regular bumps, or is prefectly smooth, or conforms to the irregularities of the underlying wood, (especially if the sporcarp is resupinate). The sporocarps range from pileate-stipitate through resupinate. These fungi are rather inconspicuous except for the stipitate forms, and are distinguished one from another chiefly by microscopical features. This is especially true of the "paint-swatch" fungi which are merely a thin layer of hyphae on a wood surface. The stipitate *Thelephora* of interest to dyers resembles a thin fleshed mushroom with irregular welts instead of gills.

Thelephora palmata

3-6 cm. tall, fungus growing erect, almost like coral, with many erect flattened branches, purplish-greyish-brown in color, with a leathery context; Spores- fawn; Habitat- found on ground under conifers late Summer through Fall.

Dyes

- ° tan
- • tan
- • • tan
- • • • olive green
- • • • • tan
- • • • • • tan

Reference: 17.

Thelephora terrestris

2-7 cm. broad, somewhat fan or funnel shaped, light lavender-brown, somewhat paler and fringed at growing margin, covered with tiny fibrils fanning out from center of each cap (radially fibrillose), flesh has leathery texture, the spore bearing surface (hymenium) has wrinkled aspect and is light greyish with a tinge of violet; Spores- brown; Habitat- growing in fan-shaped clusters in conifer forests, often around stems in the pine needles, late summer through winter.

Dyes

- ° brown
- • brown
- • • greenish brown
- • • • greenish brown
- • • • • brown
- • • • • • brown

Reference: 17.

Coral Fungi (Clavariceae)

These distinctive fungi range from a single upright stalk, to a huge cluster of much branched stalks, resembling coral or broccoli (though not green). The name *Clavaria* is now reserved for the unbranched members, while the coralloid ones are called *Ramaria*. Some of the single-stalk ascomycetes (Earth-tongues) resemble the unbranched *Clavarias*, but the spores arise differently.

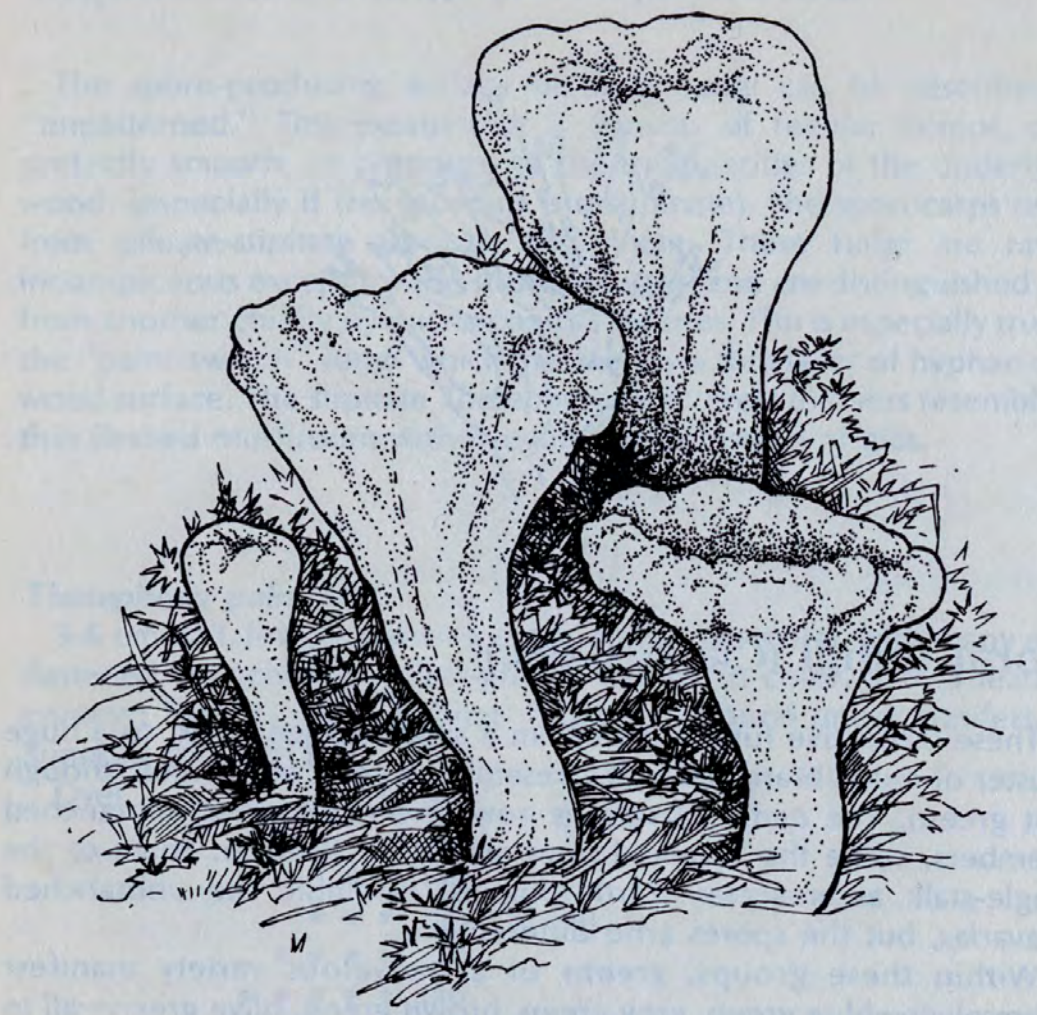
Within these groups, greens of a marvelous variety manifest themselves—blue green, grey green, brown green, olive green—all to be thoroughly enjoyed. As with so many of the groups, within any given classification are those that produce little color and among these are the Corals.

Clavariadelphus truncatus

Fruiting body- this large unbranched, orange-yellow, club shaped coral fungas often grows as tall as 15 cm., the sides are usually wrinkled or veined in appearance, but can also be smooth, the flattened top of this fungus is often cup shaped in maturity and sometimes broken in the center to show a hollow interior, the sides are usually orangish but can also be a wine-brown, base is usually light and the flesh is white; Spore print- light orangish-red; Habitat- often found in very wet, mossy areas under conifers, seeming to prefer cedar, hemlock, or yew.

Dyes

- ° ---
- • ---



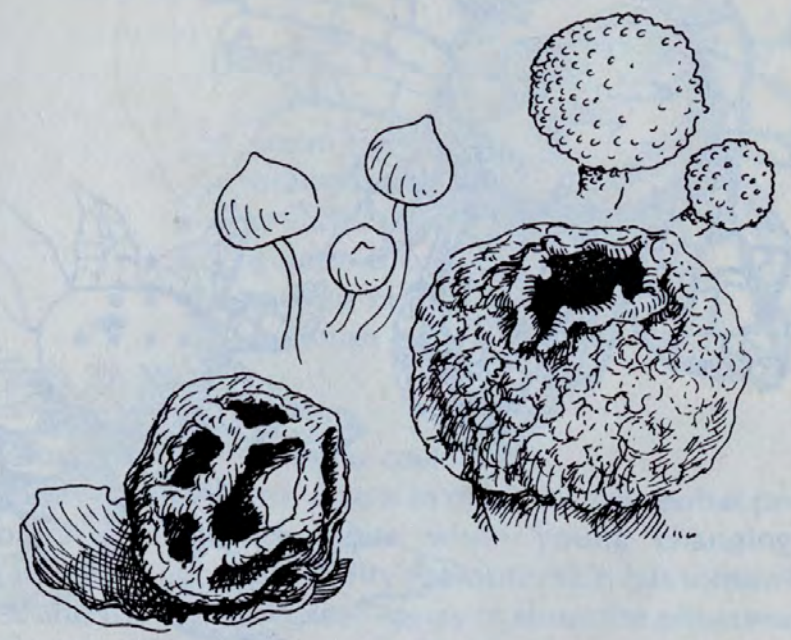
• • grey
• • • tan
• • • • beige
• • • • • lavender (good strong color!)

References: 25, 34.

Note: Another member of the coral family, ***Clavaria aurea***, a large yellow branching coral fungus, was also used for experimentation and produced virtually no dye colors.

Dyes

° ---
• ---
• • ---
• • • ---
• • • • green grey (the copper mordant)
• • • • • grey



Puffballs and Allies (Gasteromycetes)

Since the spore producing cells are internal, these fungi must be crafty in "devising" spore-dispersal mechanisms. Thus we have the bellows of the puffball, *Lycoperdon*; the cannon of *Sphaerobolus* which shoots a projectile of spores; the aromatic (not necessarily pleasantly aromatic) slime cum spores on top of the stalk of stinkhorns (designed to attract carrion insects); and the splash cup of the birds-nest fungi where "eggs" containing spores are splashed by drops of rain (just the right size) out of their fungal "nests."

This is a large and very varied group ranging in size from the giant puffball a meter in diameter and 1/2 meter thick, to the swamp puffball, *Limnoperdon*, the size of a pinhead. The Gasteromycetes with which we have experimented are the common puffballs and earth potatoes, found in gardens, lawns, and woods. The sporocarps are spherical, upside down pearshaped, or lumpy like a potato. When mature, they are filled with dry powdery spores which are sometimes enveloped in a cottony material.

These very earthy fungi produce an equally earthy range of color—browns, brown black, tans, yellow-orange, and one orange produced with tin that enlivens the group.

Astraeus pteridis (Giant earthstar)

Fruiting body- the outer wall of this fungus, which is closely related to the puffballs, expands and stays open, curving back into rays forming a star shape, these "rays" (6) have conspicuous cracks cross hatching them and the fruiting body can be up to 15 cm. wide when they are open, the "rays" have an almost woody texture when dry, no stalk; Spore sac- the inner wall of the fruiting body forms the spore sac 2-5 cm. wide, and opens with an irregular shaped rupture to emit the brown spore mass (gleba); Habitat-found on open soil or humus near conifer during fall season growing eigher singly or in small groups; Note- a similar species, *Astreus hygrometricus*, is much smaller (opening to about 5 cm.) and has rays which open only when wet, and reclose over the pore sac when fruiting body dries out again. It produces dye similar in color to those of *A. pteridis* but the smell of the simmering dye pots is so foul as to make one hesitate to experiment further with either species!

Dyes

Fresh

° warm tan
• orangish tan

• • tan
• • • orangish tan
• • • • greyed orange tan
• • • • • tan

Dried

° warm tan
• orangish tan
• • greenish tan
• • • golden brown
• • • • greyed orange tan
• • • • • greenish tan

References: 25, 36.

Lycoperdon caelatum (=*Calvatia caelata*)

Fruiting body- up to 10 cm. across in maturity, somewhat pear or cup shaped, outer skin greyish white when young changing toward cinnamon brown in age, in maturity the outer skin has somewhat warty appearance and the top of it breaks away to show the olivaceous brown mass of spores (gleba), no stalk at base of fruiting body; Spores- olivaceous-brown; Habitat- commonly found in pastures during Summer and Fall after rains.

Dyes

° beige
• beige
• • greenish tan
• • • orange (aged)
• • • • greenish tan
• • • • • beige

Reference: 17.

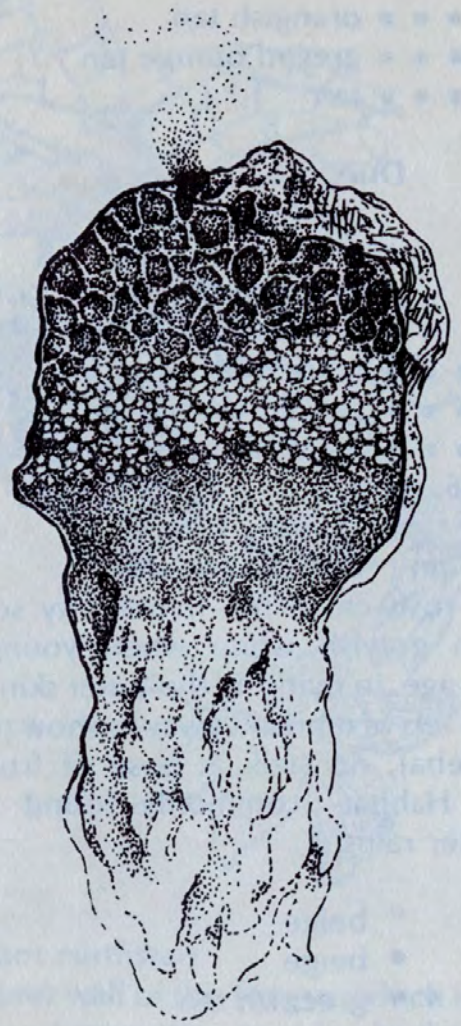
Pisolithus tinctorius

Fruiting body- up to 30 cm. tall, club shaped, dark honey-brown crusty surface which disintegrates to expose spore pockets, cross section drawing shows gradation of maturity of spore pockets, inky juice evident in young specimens, also known as "Rotten Tooth Fungus"; Spores- very fine, dusty, dark cinnamon brown; Stalk- thick, the base of which is composed of "stuck-together ropes" of hyphae; Habitat- on exposed soil, often seen single or gregarious on road banks in late Summer or Fall.

Dyes

Fresh

° black
• black



• • brown black
• • • brown black
• • • • brown black
• • • • • black

Dried

° brown black
• brown black
• • brown
• • • dark brown
• • • • brown black
• • • • • golden brown

References: 25, 34.

Rhizopogon sp.

Fruiting body- up to 8 cm. across, half buried in ground looking like yellow potatoes, the outer skin having that same consistency, the spore mass was very hard rather than powdery, yellowish in color, firm/rubbery in texture; Habitat- specimens used in experiments were found under Ponderosa pines and also on grassy hillsides near these conifers in late Fall.

Dyes

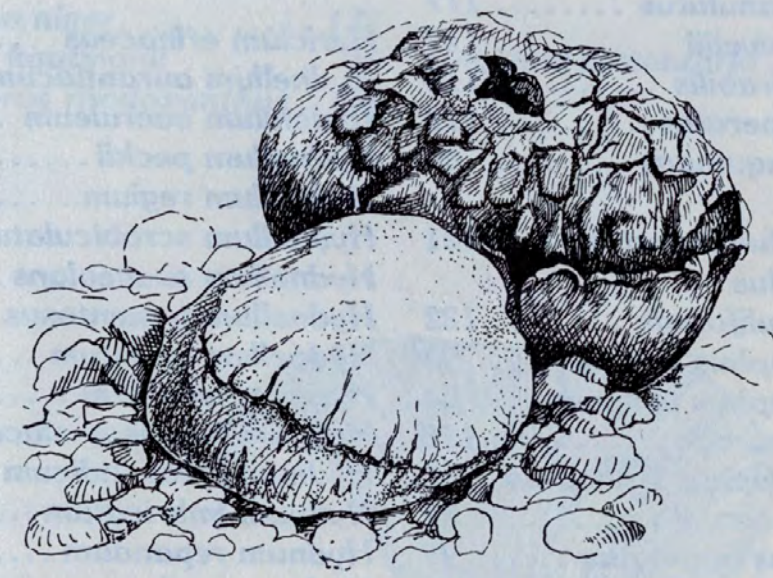
Fresh

all tests produce yellow orange

Old

all tests produce brown

References: 17, 36.



Scleroderma sp.

Fruiting body- 3 to 10 cm. across, outer skin is whitish-beige, appearing like a potato on the surface of ground, young specimen looked like a "newly risen biscuit," older specimen very cracked, showing a dark brown inner wall underneath, flesh thick, light beige; Spores- spore mass (gleba) purplish brown when young to brown in mature specimen, very powdery, almost impossible to get spores into water solution, unlike those of *P. tinctorius* which went into solution immediately; Stalk-almost nonexistant it is so short, from which a thick white complex mycelium spreads into soil; Habitat- this one found in garden on top of soil, others were partially buried, scattered. Also in damp ground of garage.

Dyes all tests produce brown.

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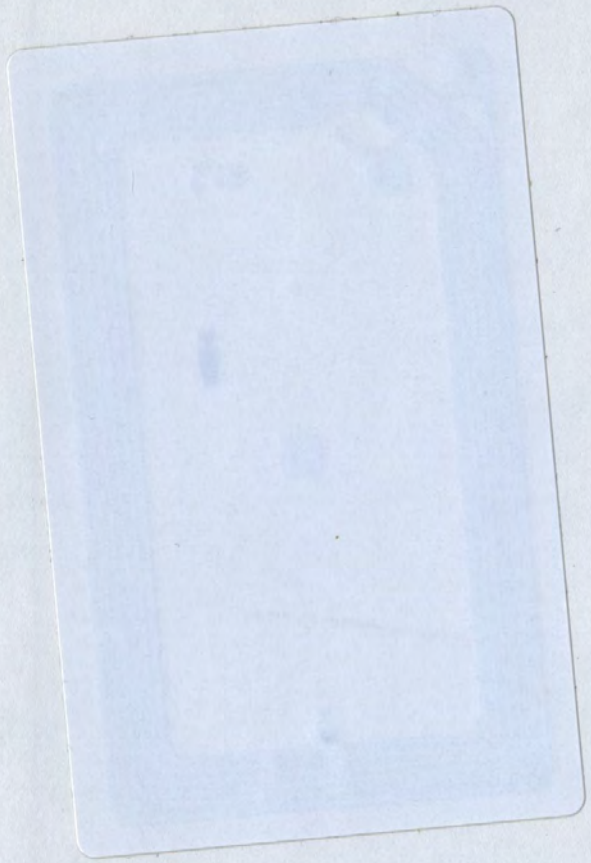
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